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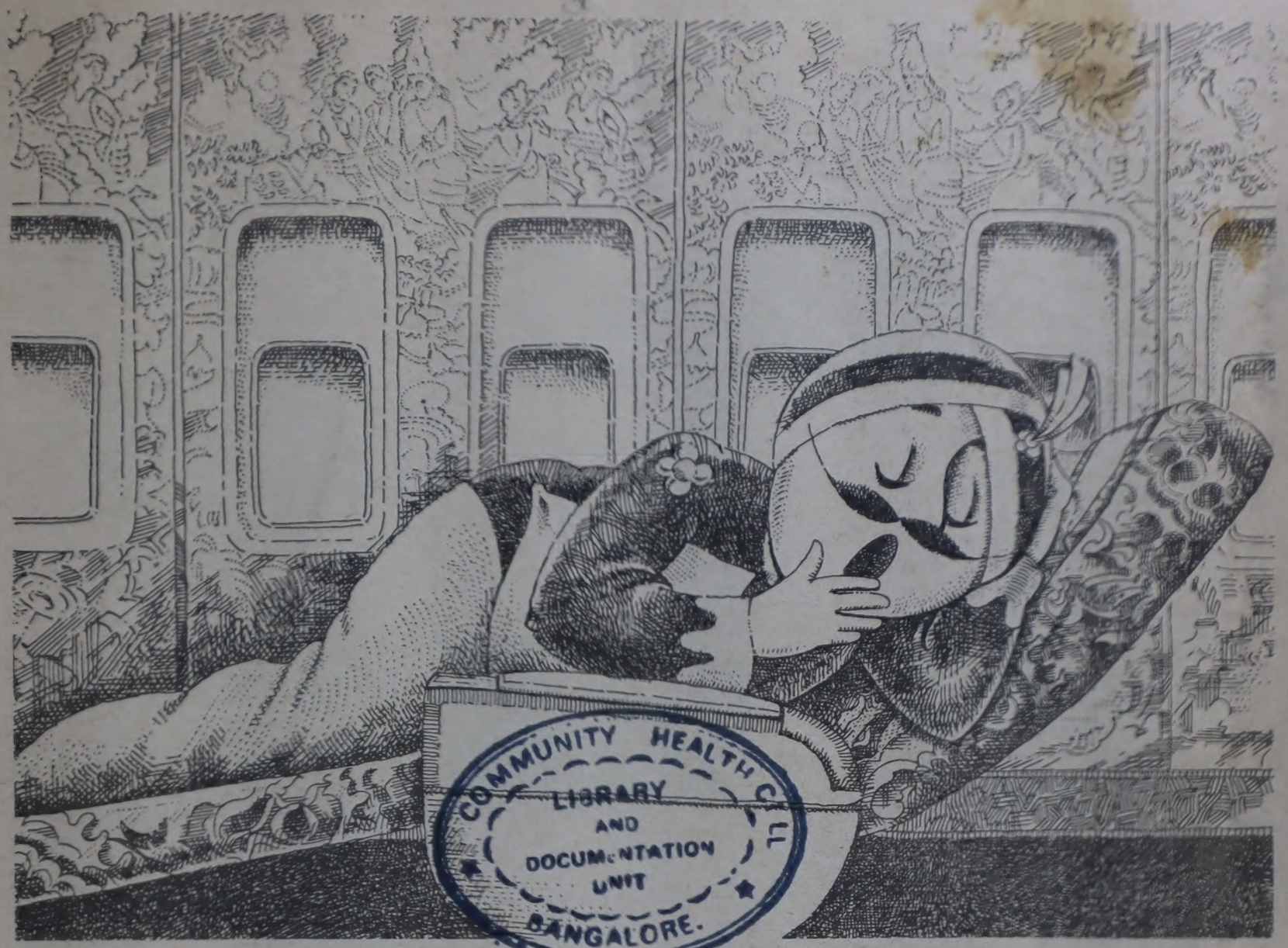

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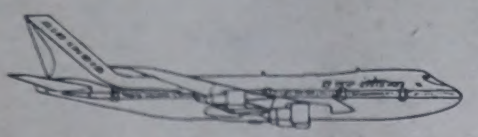

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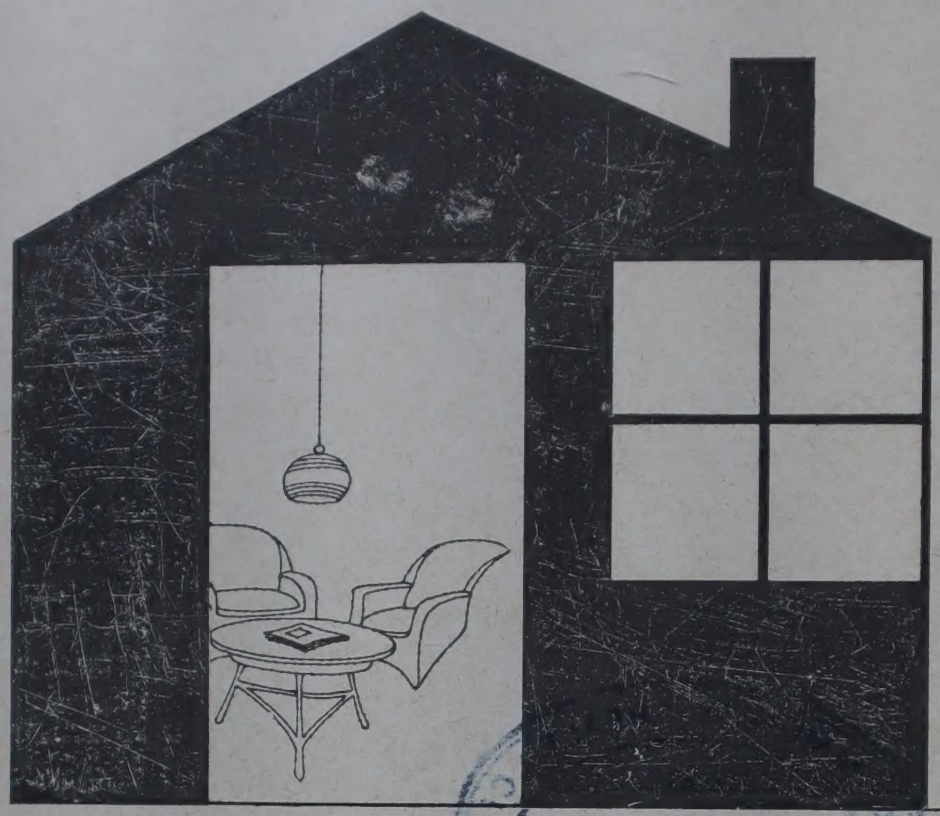

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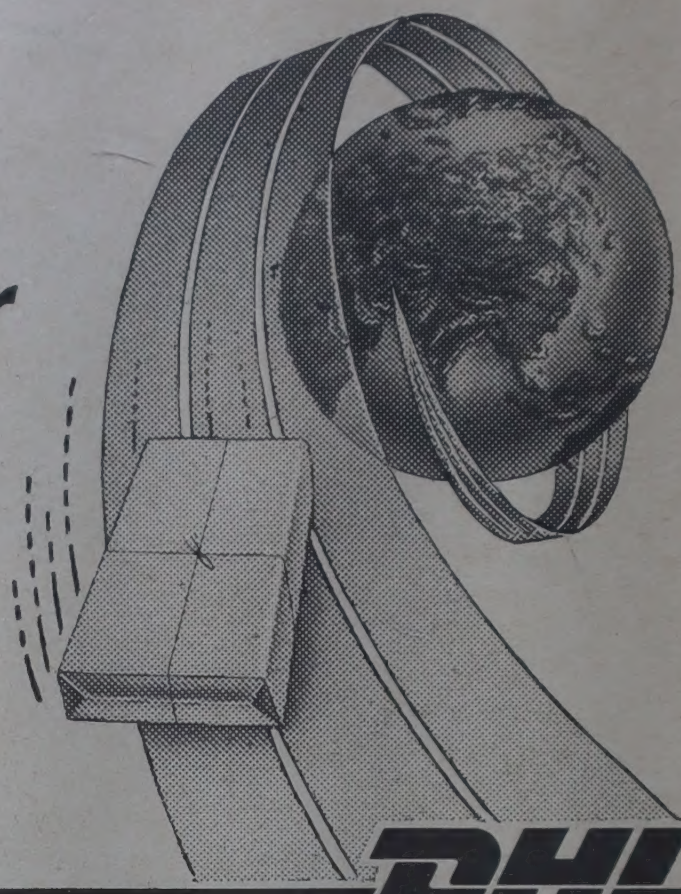

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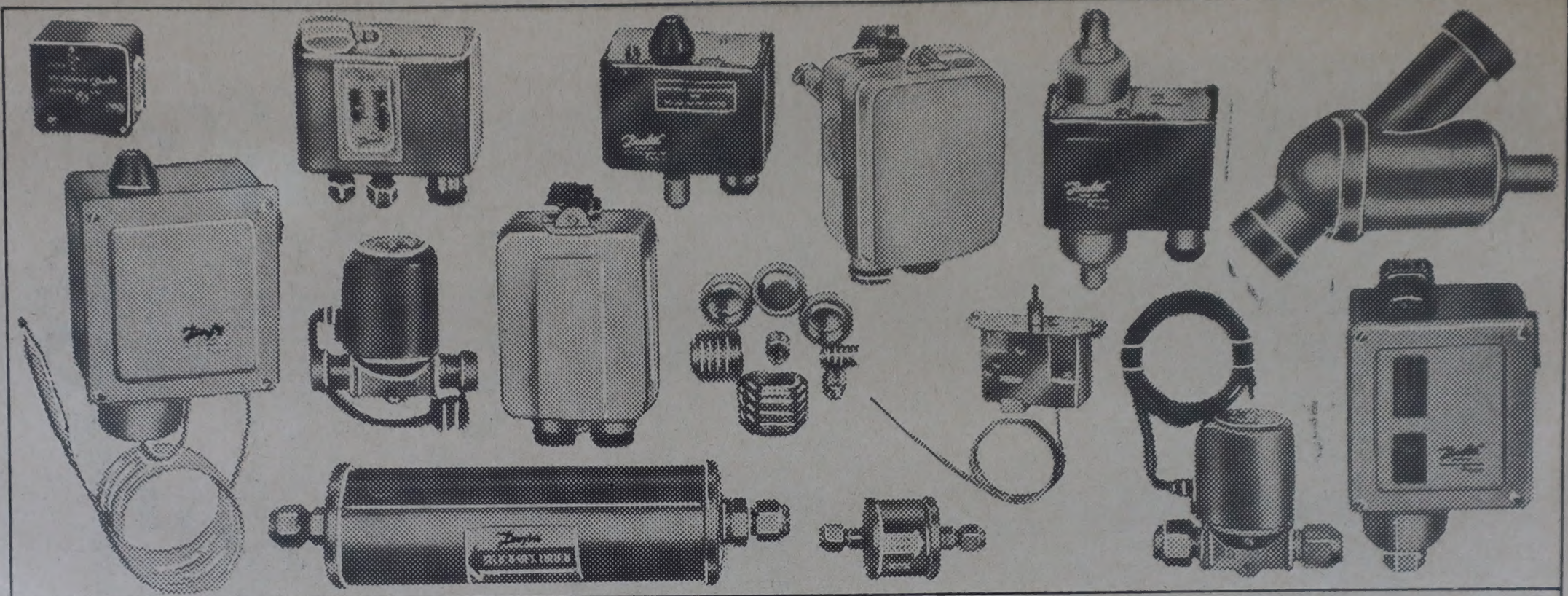

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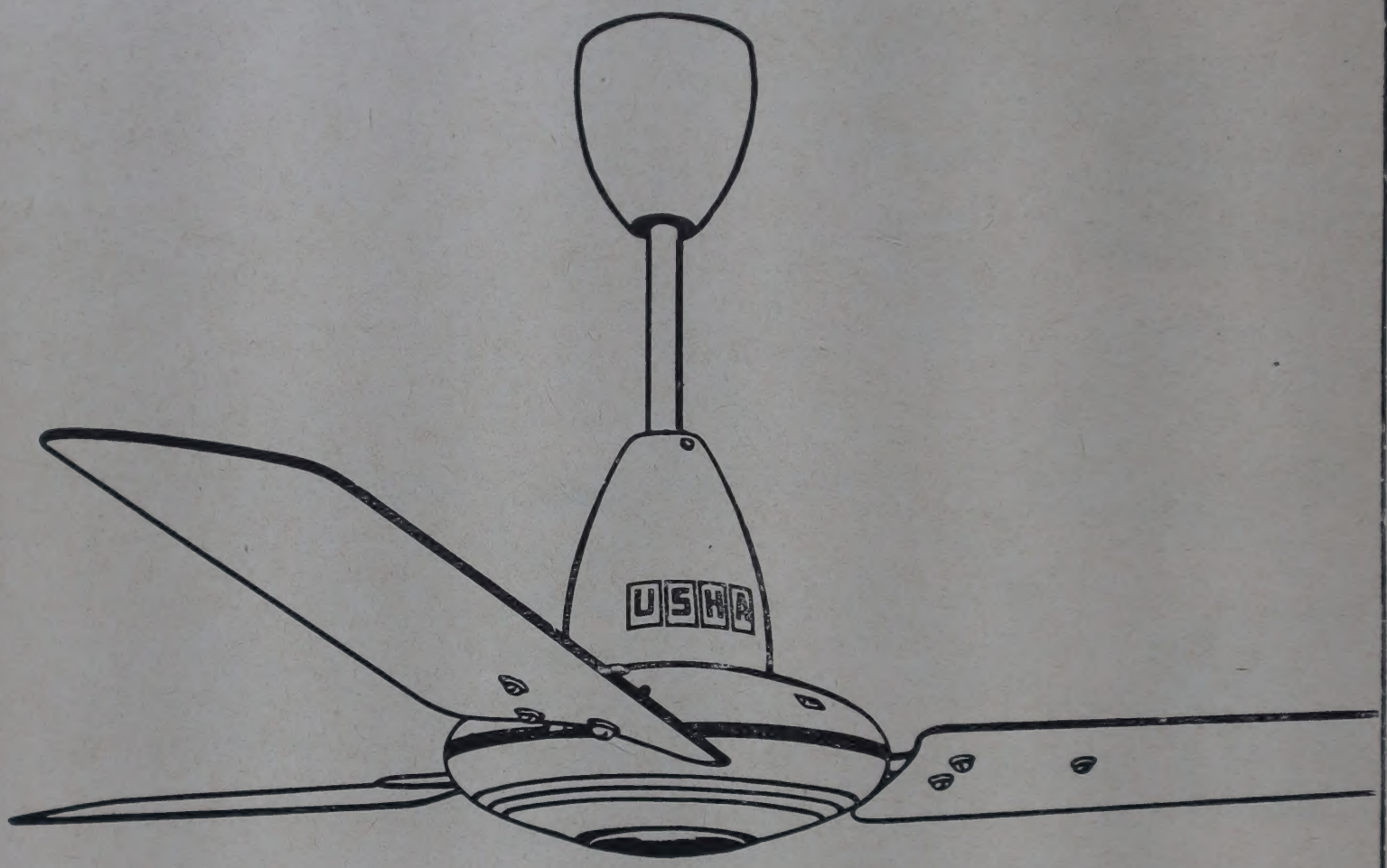

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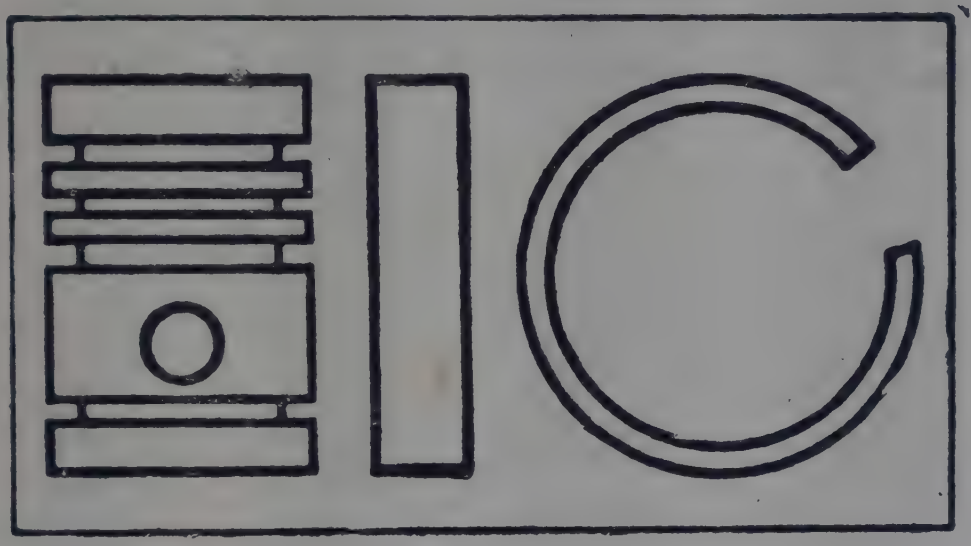

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The problem

THIS issue of SEMINAR is in large part based on a somewhat unusual exchange of by and large opposing views and perspectives — as well as the informational base of these. One wishes there were more of these in a country so beset by problems, so unclear and confused owing to lack of a clear framework of democratic decision-making, and yet so much in need of at least a dialogue among diverse standpoints which could give rise to some understanding of why people differ as they do and how to deal with the differences.

The 'exchange' reported in this issue (some of the articles written in the form of papers for it, others produced following it) was between the main spokespeople of the five Technology Missions that have been set up directly under the Prime Minister of India (with a senior Advisor of the rank of a Cabinet Minister heading it) and Lokayan, an independent group of intellectuals and activists committed to grassroots perspectives. The exchange which took place in April 1988 was facilitated by the Centre for the Study of Developing Societies, an academic body committed to promoting democratic values.

What emerged was a combination of standard official handouts facing highly skeptical and often hostile counter-positions on the one hand and frank and often animated discourses back and forth which were not only taken in good humour on both sides but brought forth a willingness to listen to the other side (and not necessarily either condescendingly as is often the case with officials, or with a mere 'tolerance of nonsense' as happens on the opposite end of such encounters). Fortunately for such an exercise, the effort that took place was not the usual exchange of dry expertise on the official side and resounding rhetoric on the side of those taking opposite positions but between alternative sets of informed and well documented positions for which Lokayan made a special attempt by inviting a large array of fairly eminent and informed set of scientists, policy analysts and experienced activists from different fields.

There was no lack of ideological fireworks, of course, nor of strongly expressed normative proposals. But even these were often put forth in rather persuasive ways, as in Madhu Kishwar's repeated pleas that the real measure of benefit or damage done by the missions should be how they affect the people, especially the victims of development policies, leading ultimately to the proposal for appointing some kind of an ombudsman on their behalf. So persuasive and forceful was this plea that it had to be accepted almost on the spot and was followed up by an official announcement some weeks later (though no credit was given to the source of the idea which was instead presented as something that the Prime Minister wanted!).

There was much else by way of both constructive and even highly dramatised provocations (as in the case of Shiv Visvanathan's mind-blowing and yet extremely schematically presented comparison of Sam Pitroda and Amitabh Bachchan which left his opposite number, Jairam Ramesh (by his own admission) thoroughly spell-bound and for a while (as one could see) tongue-tied. When he in turn responded to the provocation, he showed no bitterness (committed as he is to his chief) but was instead highly receptive and even willing to lay out the bundle of contradictions that a meteor like Pitroda represented.

There was thus much at this exchange that was worth being in. The overall result in terms of either intellectual impact, or policy outcomes, may not amount to much. In our system it seldom does. And yet I would argue that if only one had a regular dessert of such exchanges, held with mutual respect and without inhibition or rancour, and wherever possible followed up a bit, it would do some good to our present condition which is otherwise marked by both growing confusion and increasing polarisation between those in power and those outside. Whereas I am personally disappointed at both the insufficient learning that the Pitroda group took back with it and the uncalled for cynicism ('wasn't it all a waste of time?') found on the opposite side, and whereas the experience also revealed to me (something I have learnt since) that much that passes as genuine and bold initiatives in government, like the Technology Missions, in fact takes place in ways that simply cannot be relied upon, I continue to be a firm believer in organising even small openings 'openly arrived at' in a system that is not in fact that open and may well become less open, thanks both to the arrogance of those at the top and the insufficient confidence and resilience of those opposed to them.

This is not the place to present a 'report' on the exchange that took place. (Lokayan, which record-

ed and rapporteured the whole proceedings, intends to publish a small monograph on it.) Instead, what I intend to do in what follows is something quite different, namely present a brief theoretical framework on the historical context within which both the emerging approach to technology as a solvent and a deliverer for backward societies (a la the 21st century utopia) can be understood and, within that broad framework, assess the relevance and role of emergency operations like the Technology Missions.

Fixing Societies Technologically

In one sense the setting up of a whole variety of 'Technology Missions' 40 years after Independence and investing them with large authority and high visibility and status (with their number constantly going up and covering ever new areas) is in itself a sad reflection on the nature of the regime and an even sadder one on the nature of the science and technology establishment in the country. It is a regime that has little faith in established institutions for attending to people's needs, with the Prime Minister continuously running down the administration and the ruling party over both of which he presides and the elaborate network of scientific bodies which are known to be always available to do the government's bidding.

Many explanations have been offered for this extraordinary step (of the setting up of the missions): that the government had failed to deliver in crucial sectors and called for new instrumentalities; that the bureaucratic administration was lousy; that a honourable berth had to be found for a NRI friend of the Prime Minister who was no more than a technical man and who had been hanging around for too long and all he had got was one little corner in the telecommunications field in which he found himself hemmed in by all kinds of constraints; that it was none of this but simply a step to bring this confidante of the PM — who was a terribly isolated man at the top with little trust in those who manned the 'system' — right into the close-knit coterie of people who could be available to the PM politically on a day-to-day basis. In short, far from this renewed emphasis on technology further signalling the apolitical nature of Mr. Rajiv Gandhi's regime this was a primarily political act in which someone who had no clout or standing in the political system had been catapulted to a high position without accountability to either the bureaucratic apparatus or to Parliament, that there was no greater significance to the missions than that a crony of the PM had been given access to vast sums of money and direct access to the highest in the land — a veritable coup on the system. Others in the so-called 'gang of four' had each a formal official position and commensurate accountability. Not so Mr. Sam Pitroda.

Now there may be some truth in each of these conjectures; certainly in the short span of time the missions have been in existence, concern with administrative lethargy and sloth on the one hand and growing demands of a somewhat desperate political situation on the other seem to have overshadowed the original concern with infusing technological momentum on the basis of new ideas and a new dynamism and through such interventions taking a big leap forward from that of a backward position in the international arena to that of a leading power. But it is not my intention in this article to concern myself with either extraneous factors or hidden motives but instead to take the 'missions' at their prima facie value and assess the same from the perspective of a system that has all along given a great deal of importance to technological modernisation and is of late assigning a far greater role to technology as a solvent to the country's problems, and as a means of moving into the 21st century as a powerful presence both as a state and as a functioning economy.

It is also necessary to ask some fairly basic questions on the presumed role of the 'latest in technology' in realising a viable and humane future for this country and in realising the values with which we have all along identified ourselves, and which are once again — after many deviations based on ego drives of fragile individuals in power and the draw of many pseudo enchantments — being affirmed by the rulers, including by a chastened Rajiv Gandhi. These are the values of freedom, democracy, eradication of poverty, national self-reliance, cultural diversity, decentralisation, protection of the environment and equal regard for diverse cultures. Raising these questions at this juncture is more pertinent than the mere fate of the present Technology Missions, given the growing appeal of and fascination for modern technology, especially of the high-tech variety, in the ruling circles as well as among a large cross-section of mass media and middle class opinion, not just in India but in the Third World as a whole. What is more, this is

happening at a time when the whole global map of both techno-economic and political management is changing rapidly as I shall indicate presently.

While I do not believe in the dictum that modern science and technology as such are politically and ethically neutral instruments and it all depends on what use they are put to — there is no running away from their being historically conditioned to serve a set of interests and classes — I do think that technological intrusions in society can both promote conditions of greater freedom, autonomy, dignity and decentralisation for the people at large and subjugate them to conditions that undermine those values. They can enhance our will and capacity as a system to order our affairs according to our own specific socio-political vision and ethical norms as these have emerged from our own handling of problems and predicaments in the process of retaining a large measure of self-reliance and self-realisation. But equally they can lead us into some externally induced system of aspirations and inducements that can undermine our will and capacity for self-reliance and make us party to the currents and counter-currents of a global colonial economy, the demands of external strategic doctrines and the rapacious encroachments on the nation's ecology and the resources, cultural endowments and technical skills and accumulated knowledge and wisdom of the people.

Such integration into the global colonial framework can take place even when the argument for acquiring certain technologies is couched in the language of self-reliance as is the case with the proponents of the present Technology Missions in India but who seem to be woefully ill-equipped to deal with the new sophistication and subtlety of both the substance and the language of the new corporate penetration that is engulfing major regions of the world. There has taken place a striking change in the nature of international capitalism and the world colonial economy in which it is not any longer necessary to have captive markets for the supply of consumer or even capital goods produced in the north. Instead, the design now is to make the former colonies produce these goods, the profit margins on which are in any case declining while their costs in pollution and labour management are steadily rising, and only retain control on critical R&D, on intellectual property like patents and other basic knowhow that is stowed away in coded secrecy, such as on the minutiae of location and spread of natural resources, on centralised storage of diverse properties like seeds and catchments through networks of hired scientists engaged in economic espionage without necessarily being aware of the same, on new modules of satellite surveillance and, of course, on crucial components of the new technological landscape like the computer chip — as also the capacity to continuously make technological packages obsolete so that precisely those that are keen on the 'latest in technology' are rendered into a perennially dependent status. We know this to be the case in both military and civilian technologies which is also reflected in ever growing deficit balance of payments and indebtedness of the countries of the Third World, especially of the newly industrialising countries (NICs) that have gone on a rampage for the new technologies. This has already happened in the case of the Latin American and the Southeast Asian NICs and is likely to happen even more in the case of countries like China and India who have been successfully sold the highly seductive slogan of their becoming the new 'industrial giants' of the world and the even more tantalising prospect of their becoming regional superpowers with geopolitical hegemonies in their respective zones that would, unlike in the past, be respected by the global superpowers.

The most striking change that has already taken place that old ideological blinkers may not allow us to grasp fully is that both the idea of world capitalism based on colonial-style economies providing captive markets and exploitation of labour and of world imperialism based on a number of weak dependencies have already become outdated even though some descriptive features of each of them might still survive. The new thinking — and language — of managing the world that is emerging is that of a 'world order' that is based on the interdependence between the established major powers wielding extraordinary technological and financial resources — US, Japan, the EEC — and a select set of client states — USSR, China, India — having the potentiality for creating one integrated global order of both techno-economic and strategic and military power. It goes without saying that a large number of nation-states and both their enormous populations, along with the large underclasses of populations within the integrated universe too, are to be excluded from such an order, considered dispensable, as historically superfluous and anachronistic. In this the rhetoric of an integrated world order of cooperating states — all possible conflicts of interest among them as well as the hitherto accepted ideological struggles are to be negotiated and ultimately eschewed — gets precedence over that of sovereign nation-states, each representing specific populations, the furtherance of whose interests was their primary responsibility. The new jargon does not lack a nationalist credo; on the contrary, the new elites mouth nationalist slogans with greater fanfare. The only difference is that the social base of the new nationalism is predominantly urban, upper middle class, elitist and technocratic.

It is not surprising that one of the most articulate proponents of such a cooperative world order is Mr. Rajiv Gandhi, the Prime Minister of one of the poorest and economically the most exploited regions in the world. For long in making, the rhetoric came out most eloquently during the recently held conference 'The Making of an Earth Citizen' at which the most clever and seductive statements of the latest slogan-mongering of the national bourgeois mind was set forth. The 'citizens of the earth' are to own the resources and ecology of the planet earth and ensure such 'sustainability' as would enhance

their already achieved living standards through access to the technological promise of the new world order; those who cannot make it to the technocratic ante rooms of such an order are to be the meek and aspiring lot. Others falling for such a world order with increasing gusto for it, have been Deng Xiao Ping, Gorbachev and Ronald Reagan, the latter having launched it all in the first place.

The other major catchword of the new dispensation is disarmament between key states in the high cost sectors (not to be confused with broad-based peace or democracy or economic equity for the masses of the world) that could be followed up by high growth industrialisation based on a technological and communications revolution, gradually eschewing from the vocabulary issues of poverty eradication, class conflict, historical antagonisms and cultural plurality. The new Western corporate bourgeois mind-set behind all this world orderism is not new. What is new is that the leaders of erstwhile sources of challenge to Western hegemony are becoming pliant and readily available converts to it. And of course at every stage in this unfolding world order there is a doublespeak — on ecology, on integrity of cultures, on increasing communications between 'peoples', on intellectual freedom and human rights, above all on economic development. The poor and the wretched of the earth are not even aware of the brave new world that is being carved out for them by these 'citizens of the earth'. Only those who are conversant with the terrible traumas that have accompanied the struggles for citizenship throughout history could even begin to ask the relevant questions.

The New Missionaries

Now given such an emerging scenario of a sharply intensified structural dualism of populations and peoples (including so many 'nations') of the world of which access to high technology is to be the crucial catalyst, what role and significance can one attach to the kind of Technology Missions that are currently being let loose on us — with a mandate that is nothing short of making technology a servant of the people and in particular of the poor and the peripheral, the historically victimised and currently exploited, among them? It is a mandate that was incidentally reiterated by the Prime Minister at the recently held Indian Science Congress where, after going through the ritual of paying tributes to the scientific community for its high achievements, Mr. Rajiv Gandhi explained that the reason for setting up the Technology Missions was to carry the fruits of technology to the poor.

One can take either of two opposite positions. One position to take would be the skeptical one in which the missions are seen as no more than a continuation of the old elitist bias of the science and technology establishment serving the interests of the privileged classes, with no sign of their making a really new start. This would seem to be the more likely scenario. First, there is no sign of any clear understanding among the TM group of the larger issues involved in ordering a preferred relationship between technology and the social structure, no basic insight into the necessarily colonial nature of any unified and homogenous model of technological modernisation; no recognisable search for alternatives in technology that are based on an alternative theory of knowledge and an alternative vision of the future. There is no inkling that the men who have been put in charge of the missions are in any way different when it comes to a blind faith in 'S&T' (in capitals), in the notion that the path of progress lay in acquiring more and more of technological prowess and within that the latest and the most 'sophisticated', the sleek and the dandy in technology, not so much any more for gigantism and the 'big-bang' effect but still for one that would make us all sit up and say, 'that's it, I'll have that and nothing short of that'. If anything the point of departure of their model of self-reliance (as compared to the earlier import substitution and other models) is their clear contempt for anything less than the latest (behind which they see some design to keep us weak and backward), and making the latest (which means the latest in the West) somehow serve our needs (reminds one of Rajiv Gandhi's very early pronouncement that poverty will be removed through our adoption of high-tech).

Moreover, these men, like their forebears, and despite their seeming populism, still believe in 'taking technology to the people', in fact now with missionary zeal are ceaselessly roaming round all the states and at district and lower levels, converting the unconvinced, straitjacketing and homogenising the chaos they discover at various thresholds of technical and administrative arrangements, reducing the number of variables that seem to be at work (a constant theme in Pitroda's invectives), making complex structures malleable and manageable. Technology is still to be a command performance, carried out in a quick and phased manner, and let everyone fall in line. There has been too much experimentation and dilletantism, the need is for decisions that are carried out down the line. (The latest I heard was that there was a moratorium on new ideas).

While there is a tremendous soft corner for the poor and the dispossessed, there has been little thought given to people's own reservoirs of technical knowhow and accumulated wisdom (despite their occasional brush with evidence of this). There is a concept of self-reliance of the Indian state, not of self-realisation of the Indian people. Hence the surprisingly technocratic rather than participative view of how to reach basic necessities like water, milk, fodder and oil seeds and highly sensitive inputs like protection against disease and literacy to the people. There has been little by way of learning from the people on how best these could come within their reach from which they had been systematically excluded, not the least by technologists and scientists who were particularly immune to such listening. There is, in all this, despite the repeated strain on anti-elitism, a clear disowning of traditional wisdom and popular knowhows, and

even more of 'it may have worked then but it can't work any more'.

This came out most dramatically in a recent dichotomy between the *charkha* and the chip drawn by Pitroda, implying that just as the *charkha* was relevant for *swaraj*, the chip was for ushering us into the 21st century; the *charkha* had ceased to be of any use any more. Little does he realise that the 'chip replacing the *charkha*' represents more than just a technological choice; it involves the whole issue of where the people stood in making technological choices — what enervates them, stirs them from their stagnation and apathy, makes them the authors of their destinies. What the *charkha* had demonstrated beyond any doubt was its capacity to act as an agent of human liberation, and there lies the crux. The *charkha* too was a technological device but there was no confusion or ambivalence about its purpose. Which only underlines the key issue with which we started regarding the relationship between technology and social change. If we were a free society, technology could be made into an agent of social liberation, above all from the global colonial order. But in a society that cannot yet be said to be free, and in which a handpicked elite rules the roost and is increasingly given roles that lack even minimum accountability, technology cannot but be a coloniser — even if the new colonisers be sincere missionaries with their hearts bleeding for the poor.

Nor is this simply the case with technology; it is also true of the economy, the government, the state as a whole. For so long the Indian economy and the state have been pursuing goals that have not been intrinsic to the needs of the Indian people. And so many times all it has been engaged in is mere shadow-boxing, chasing chimeras while believing we were 'developing'. The same can turn out to be the case with the Technology Missions. A society that has lost its moorings goes for superficial shortcuts that appear like genuine innovations, looks for instant solutions, finds some wizard who can do it with dash and drama, someone with charisma, a playboy who can both manage the stage and entertain the Prince — especially when the latter lacks a mind of his own. May be this is all that is happening, something that attracts a lot of attention while it lasts (witness the massive media attention that Pitroda has received) but will soon pass into oblivion. Not only is the story of technology in history replete with such passing phenomena, the story of highly gifted and magnetic courtiers and entertainers is also full of them.

In one sense Pitroda and company do represent something extremely superficial. Personally Pitroda (and so much depends on this one man) represents a combination of three things: an intensely tense bundle of nerves, out to 'fix' things; a patriot so deeply in love with his country from distant America that all he could think of was to fix his country too into a fully functioning machine that would work (he always complained that 'nothing seemed to work here'); and a simultaneously emotional and hard-headed nationalist keen on making his country self-reliant technologically and therefore politically, oozing a brand of nationalism that was so crystal clear that it hardly needed any roots. In short, a genuine do-gooder without any depth. There are so many technical and managerial people, both residing in this country and visiting from abroad (more of the latter variety) who exhibit these qualities—simpletons out to achieve miracles. Pitroda may be just another specimen of this species, only with greater political clout both because of an early encounter with Rajiv Gandhi (long before the latter became Prime Minister or even moved close to becoming one), and because of his unusual tenacity to go after whatever he has set his mind and heart on. Which is of course no mean a quality, particularly among technical people.

This is a genre of patriot technologists that present a far cry from the early generation of scientists, spanning the period from the late nineteenth century to the fifties and sixties of this century, men and women of great versatility who combined deep learning, cultural and philosophical depth as well as great familiarity with Western thought and above all with the deeper springs of scientific creativity. They thought of themselves as part of the Indian renaissance conceived as a flowering of the Indian mind which, while it sought to reach out and was greatly influenced by Western thought, retained many distinctive Indian traits. The new generation of technomanagers lack all this. For them technology was a fix, conceived as pinning the locals to an exogenous substance, the latest in the lab of modernity.

They also lack the finer elements of what in scientific jargon is called the 'scientific spirit' (I am deliberately avoiding the by now emotive phrase 'scientific temper') — the humility implicit in it, the sense of wonder and curiosity, the wisdom born out of a trained skepticism, a special mould of the positivist, the aesthetic and the speculative that informed some of our early scientists, in fact right upto the decades dominated by the early Nehru. By contrast, today's powerful technologists (there are few real scientists left anyhow) exhude an arrogant confidence and pride — not so much in ideas as in artefacts, in the 'it can be done, all you need to do is to break the barriers' psyche. This in itself may not be dangerous. What is dangerous is that such arrogance gets wedded to a monistic and exclusivist pursuit of a homocentric worldview, casting out other philosophical — and scientific — positions as both invalid and heretic, in the process surrendering to the dominant colonial perspective on social change, in the end subjugating the spirit of man (represented by the *charkha*) to the spirit of the machine (represented by the chip). This is not what the great Indian scientists stood for.

Indian Science: The Emerging Divide

And yet on deeper reflection it is possible to take a totally different postion on the contrast between

the generation of 'gentlemanly' scientists and technologists representing the advance guard of India's search for modernity who were on the whole optimistic about India's capacity to make it in the modern world and the new, less patient and more anxious and even somewhat intolerant brand of technologists who are not satisfied at what India has achieved — and are prepared to say so. For all the claims of Indian science and the achievements of some of its stars, for all its past glory represented by some of the finest Indian minds (compared to whom today's scientists appear like pygmies), and for all the virtuosity and eloquence of our scientific ambassadors at the various conferences in our time, the fact remains that with very few exceptions they have been a class apart and have had little or no contact with the basic social reality that constitutes India. There is the science and technology establishment of India and there is the rest of India — the two are as distant as distant can be. In fact in the structure of privilege and patronage and influence the S&T elite has had a major share, including a fair amount of share in the spoils of development, as well as a fair amount of benefits from the country's continuing colonial and extra-territorial linkages. Nor is there any great sign of guilt or self-doubt or serious questioning in this regard. We may have built an 'impressive industrial and communications infrastructure', but to what extent has this infrastructure included access to potable water, adequate forest cover, requisite health and nutrition for all and minimum access to literacy for our people? There would have been no rationale for the Technology Missions if the various Plans and the scientific effort that had already taken place had in fact delivered the goods.

The fact is that not only has our scientific community failed to measure up to the challenge of creating a just and humane society, they have by and large fallen prey to a model of development in which dignity and well-being of the people are to follow sometime in the future after abstractions like rates of economic growth and acquisition of advanced technology are met but in the meanwhile fairly concrete provision for their own material living in keeping with international standards have been provided, not excluding a continuously expanding scale of opportunities in international bodies and transnational ventures. It is easy for some of us to raise our eyebrows at the entry of NRIs and other aliens among our midst. But what about the scientists and the economists who may continue to live here but manage to enjoy the advantages of the non-residents without the odium that attaches to that? In the words of my colleague D.L. Sheth, there are two types of alien Indians in our midst: the non-resident Indians and the resident non-Indians (the description is not limited to scientists and technologists and applies as much to politicians and bureaucrats in power).

It is against this state of affairs that one needs to assess the Pitroda phenomenon and all that goes with it — the missionary zeal, the impatience with forms, the occasional display of nerves. And it is against the same state of affairs — in which the presumed custodians of 'progress' and 'enlightenment' have become a vested interest — that the new genre of social activists seem to be confronting the new-style techno-managers who too want to play activist roles. As against the older vintage of self-possessed bureaucrats and professionals, both these sets of activists represent an effort and a yearning that, in its sheer restlessness, is new. Ways have to be found for these two sets of people to think and work together instead of being at loggerheads. At least that is the message that came off to me from the exchange that took place under the auspices of Lokayan in April 1988.

The basic problem with both the Technology Missions and all the other things that Satu (Sam) Pitroda has earlier tried to do — e.g., his blueprint for a communications revolution for India that he was convinced will usher in a democratic and decentralised society — is that he has relied far too much on official position and patronage for implementing his ideas, and of all people on Rajiv Gandhi for whom and whose survival he has staked so much. This is bound to be a kiss of death. Not perhaps for the newly found political aspirant in Pitroda but certainly for the social dreamer in him.

Let me end this article on a personal note. In an interview to the *Illustrated Weekly of India* and elsewhere, Satu Pitroda has referred to my role in his transition from being a mere technician to participating in public affairs in India. What had happened was that on one of my visits to Chicago in the early seventies I had discovered this extremely fertile and innovative Indian working for an American telecommunications company which was hijacking each of his inventive inputs into a patent in its own name (with a measly payment for his labours). I could not stand this and asked him to get out of this bondage and set up his own company or institute. He did this — and much more — and turned out to be a roaring success. He also committed himself to apply his talents and resources to his own country. Let me today ask the same man: quit the official bondage in which you and so many others who have been inspired by you have got trapped, come out in the open and work at the grassroots with which you empathise and where you in fact belong. You are wasting your time where you are and getting tied into knots from which you will find it difficult to liberate yourself. Buy your freedom before it is too late. As you did in Chicago.

Let the Technology Missions too be conceived in the framework of movements from below instead of so much fiction perpetrated from above.

I'd better stop here. Advising others is so easy to do. It is not what I normally enjoy doing. Except with exceptionally motivated people. Like Pitroda.

RAJNI KOTHARI

Charkha, chip and community

JAIRAM RAMESH

THE objective of this essay is to describe what the Technology Missions are, why and how they came into being and what they hope to accomplish. The missions cover a very wide canvas and tomes could be written on each of them; the discussion that follows is really in the nature of an overview. It is meant to whet the appetite of those who see in the missions a renewed and exciting challenge in a system in which the accent is on problem identification rather than problem solving, in which the prevailing atmosphere is one of cynicism and indifference rather than of enthusiasm and hope, and in which the immediate response to any issue is to externalise it to the point of insolubility.

The essay is divided into two parts: the first provides the background to the missions, while the second highlights their essential features. The title of the essay captures the spirit of the Technology Missions. The Charkha symbolises tradition from which there is still much to learn; the Chip represents modern techniques which offer a fantastic opportunity to leap-frog; and the Community stands for something that has been destroyed by four decades of centralised planning and that needs to be recaptured — the capacity for self-help and solving problems without always running to the government.

I

Genesis: 1984-1986

Contrary to popular beliefs that the Technology Missions represent the PM's obsession with American-style management or that they are Sam Pitroda's brain children, these missions have an impeccable intellectual background. Whiz-kids had nothing to do with their birth. The Fabians in government are the originators of the mission idea. It was the July 1984 Approach Paper to the Seventh Five Year Plan that pointed out:

> 'The achievements of various mission-oriented science and technology agencies have been substantial. The human expertise and know-how in basic technologies achieved in this process is applicable in many other areas of industry, agriculture and rural

development. There is a whole host of problems in these areas, the solution of which can be simplified by the application of technological knowledge so available. This effort should, therefore, be part of the planning process, particularly in the area of rural development'.

The mission-oriented science and technology (S&T) agencies alluded to in the Approach Paper were the Indian Council for Agricultural Research (ICAR), Indian Space Research Organisation (ISRO), Defence Research and Development Organisation (DRDO) and the Department of Atomic Energy (DAE). The premise is that the model responsible for apparent successes in technology development and application in the areas of agriculture, space, defence and atomic energy can be replicated in other areas as well. The idea is to bring users and developers of technology together at the very first stage of the innovation cycle and put pressure on the civilian R&D system to generate useful and relevant technologies.

The mission approach is the response of the scientific community (or more precisely, as Jayanto Bandopadhyaya made clear to me recently, of the scientist-administrators) to what is perceived as the marginalisation of the vast and sprawling S&T infrastructure from the mainstream of development activity and the growing feeling that investments in science and technology are not yielding results in areas that matter most. The missions, with their clear performance, time and cost objectives, thus represent a renewed challenge to a somnolent S&T community and an opportunity to translate knowledge from laboratories into actual use.

The detailed sectoral programmes of development in the Seventh Plan were finalised and made public in November 1985. According to this document:

> A special feature during the Seventh Plan would be the undertaking of S&T missions. The objective would be to accomplish specified tasks with high visibility. A significant S&T component should be involved in the fulfillment of these tasks. Such an approach will foster relevance, provide motivation and automatically establish organic linkages which are live and working between the concerned sectors.

An illustrative list of thirteen missions was also provided. These were:

* Self-sufficiency in oil seeds;
* Increased production and security in dryland farming;
* Control of major diseases by immunoprophylaxis;
* Cattle herd improvement and increased milk production through embryo transplantation technology;
* Linking of all habitations by communications technology;
* Devices for voice and visual pattern recognition;
* Action plan for prevention of pollution of the Ganga;
* Integrated vector control against vector-borne diseases;
* Control of iodine deficiency disorders;
* Production of immunodiagnostics;
* Immunological approaches to contraception;
* 1.2 micron technology for chips;
* Development of amorphous silicon solar cells.

After this, there was a veritable flood of ideas. The CSIR prepared a list of Technology Missions. The Science Advisory Council to the PM gave its suggestions, both on strategy and specifics. There was a two-day workshop at Vigyan Bhavan (where else?) attended by over a hundred scientists and technologists to finalise a set of technology missions. Influential scientist-administrators gave their ideas independently to the PM. All these inputs were worked upon by the PM's aides. The PM's intervention was significant in ensuring that the emphasis was not merely on engineering, technological or scientific activities but also on the social benefits flowing from them. The political concern was that societal goals need to be achieved through planned effort in which science and technology play a key role. Thus it was that, at the PM's initiative, the Literacy Mission came into being and the Water Mission received an impetus.

The five Technology Missions took shape at different points of time between the middle and later part of 1986. The fact that they took shape separately reveals something about how programmes are formulated and put into place: three of the five missions have essentially the rural woman as the 'target' but they were conceived not as part of some grand design but as schemes of individual line departments. Synergy cannot be achieved with this approach and this remains the bane of our planning in the social service sectors. In addition to the five Technology Missions, eight S&T projects in the mission mode, as they are called, were also initiated.

In the Technology Missions, the pressure is really on the delivery systems at the state and local levels, although that was far from the original idea. In the S&T projects, the heat is only on the S&T infrastructure. The Technology Missions relate to:

* rural drinking water;
* immunisation of pregnant women and infants;
* adult literacy;
* self-sufficiency in edible oil;
* improving the telecom network.

A sixth mission on dairy development was launched in August 1988.

The S&T projects in the mission mode are:

* immunological approaches to fertility control;
* integrated vector-control of vector-borne diseases;
* goitre control;
* development and production of immunodiagnostics;
* cattle herd improvement using embryo transfer;
* operationalisation of the National Natural Resources Management System and the Natural Resources Data Management System;

- national centre for medium-range weather forecasting;
- development of amorphous silicon solar cell technology.

A ninth project on technologies for the rehabilitation of the handicapped has just been added to this list.

It could well be argued that the areas chosen for the Technology Missions are not necessarily the most appropriate if the emphasis is to be on technology *per se*. Three of the five missions — water, literacy and immunisation — are basically societal missions in which technological interventions form only a part, particularly where state and local administrations are the implementing agencies. The compulsion for the oil seeds mission is simply that we have imported almost Rs. 4,000 crores of edible oil over the past five years and there is need for quick import substitution. The edible oil 'problem' has therefore a pressing macroeconomic imperative. The telecom mission thus appears to be the only true Technology Mission in the original sense of the term.

Nevertheless, the three areas of societal missions are fundamental; if anything, the fact that we have Technology Missions in the areas of water, literacy, and immunisation today is a searing indictment of our development record over the past forty years. The fact that these are called *Technology* Missions is secondary. They are missions requiring missionary zeal, a sense of urgency, sustained management focus and the involvement of each one of us. Moreover, much of the criticism levelled at the concept of Technology Missions in societal areas arises from the tendency to narrowly equate 'technology' with 'high-tech'.

Technology is not just a computer or a drilling rig: it is using the right device to do something better. Thus, it is the use of satellite imagery to pinpoint underground water sources just as it is filtering water free of Guineaworm dangers with a piece of cloth. It is as much the development of a digital switch as it is the use of an improved blackboard. It is as much the technology of vaccine production as it is the technique of organisation, motivation and mobilisation for adult literacy.

The mission areas are basic to development and need to be tackled, albeit not just in the technological mode. Nevertheless, the selection of the mission areas does reveal something about the way our planning process operates. While the PM has been trying to change much of this, the malaise is deep-rooted. Its symptoms include:

- the hubris of the S&T community and their lack of understanding of how delivery systems in social service sectors operate;
- the mystique of modern science and technology that leads to an eagerness to embrace technological interventions;
- the lack of integration and communication between the S&T community and administrative departments and line agencies at all levels;
- the fascination with the technology 'push' model and that, too, from laboratories and institutions which have no idea of user needs;
- the overriding emphasis on the visible, the big and the modern, to the neglect of the traditional, the incremental and the basic;
- the near-total absence of involvement of the state and local administrations in planning from an early stage;
- the in-built tendency to think only in terms of vertical programmes and the inability to transcend narrow boundaries of line departments and achieve synergy;
- the lack of a clear area focus in planning depending on the magnitude of the problem;
- the lack of attention to matters relating to organisation and management at the field level where Plan schemes are implemented;
- the old-boys network that operates in planning which ensures that only a chosen few and the same few get on to committees and planning groups;
- the lack of channels of feedback to tell the policy makers and planners what people 'out there' really want by way of technological help.

The basic problem with the Technology Missions during 1986-87 was that they were thought of as fiats issued from Race Course Road. Indeed, for the most part of 1986 and 1987, the missions were dismissed as the PM's personal hobby-horse. The changing relationship between the bureaucracy and the political leadership, beginning late 1986, could not have been without its impact on the missions. The only time the missions were noticed was in February 1987 when the PM, according to press reports, lost his 'cool' in a presentation and took the mission officials to task.

Although the missions had been announced, there was no consensus on their objectives, strategies and work programmes. State governments, who were to implement four of the five missions, had no clue about what the missions were and what they were expected to do. Scientist-administrators were unable to take the administrative system into confidence and convince them that the missions represented a new approach to problem solving with the emphasis on developing cost-effective solutions. Mission managements had almost no autonomy or flexibility in decision-making, thus making a virtual mockery of the mission concept. Public awareness of the missions was almost nil and even those who knew something about them, saw them as being very esoteric.

As it turned out, different departments saw in the missions different things. For instance, the Department of Telecommunications made the entire Seventh Plan for the telecom sector a Technology Mission, seizing the idea as an opportunity for raising Plan allocations. The Department of Health took the on-going Universal Immunisation Programme and called it the Technology Mission on immunisation. Indeed, except for telecommunications, all other mission activities are in the revised 20-point programme. To that extent it is true that the programmes which consti-

tute the core of the Technology Missions are not new. They have been around for some time. But in some cases we have learned from past experience. For example, the literacy mission is based on over 50 evaluations conducted of the 1978 adult education programme.

Preparing for take-off: 1986-87

Until late 1987, most people regarded the missions as black-boxes. There had been no systematic effort by the administrative machinery to communicate to people what these missions were all about. At the same time, while it was recognised in discussions that the missions were highly 'political' in nature, no serious attempt was being made to create a political consensus and mobilise the support of elected representatives. The missions were being viewed purely as government programmes to be implemented by individual line departments.

It was on October 2, 1987 that Sam Pitroda took over as Adviser to the PM on Technology Missions.* Sam Pitroda could not have arrived at a more opportune time. He was just the tonic the missions needed and with his coming the adrenalin must have started flowing again in the systems of the poor mission managers who were 'stuck' with this strange animal which very few people understood and even fewer wanted. The missions needed a cheer-leader, a product champion. Again, contrary to what most people think, Sam Pitroda was not to be a missions controller or a bureaucratic czar, but a catalyst, an idea-broker, a trouble-shooter and problem-solver. He was expected to bring the enthusiasm of the recent convert, the freshness of the ignorant and the concern of the intelligent layman to getting the missions going. The tasks before him and the mission teams in the respective line departments, both at the Centre and in the states, were clear:

* Redefine missions to give tangible focus;
* Make distinction between Plan programme and mission explicit;
* Make technology intervention clear;
* Create consensus on targets, funds;
* Define institutional roles clearly;
* Prepare detailed documentation and make that public;
* Involve political parties and elected representatives;
* Get full-time management team in place;
* Identify specific packets of work to be done;
* Take missions out of Delhi;
* Work with states and district officials;
* Identify missionaries in each state;
* Get political support in states;
* Inform public and make missions visible;
* Reach out to NGOs and voluntary Agencies;
* Enlist support of activist groups and opinion-makers;
* Network with groups active in the field;
* Formulate communications strategy for beneficiary groups;
* Integrate missions with on-going schemes;
* Set up system for evaluation and audit;
* Get policy support for missions where essential;
* Standardise, simplify and integrate management information systems;
* Send clear signals on operating philosophy, self-reliance, openness, decentralisation, multiple channels of delivery, new approach to Centre-state relations.

The missions, as missions, are really a little more than a year old, and the past year has been devoted solely to getting these activities going within the existing system. It is indeed a sad commentary on the state of our public administration that for about a year after the PM had announced his intention, the missions were in hibernation. Perhaps people were expecting the PM himself to be the mission manager! When Kennedy said that an American must be on the moon by 1970, the system galvanised itself into action. Here, in India, when the PM says that we should try and see how technology can be used in water programmes, people will point to the 'socio-political' context which, they suppose, makes it impossible to do so. When the PM says, we should see how immunisation will benefit our kids, people say that immunisation is important but what about malnutrition? When the PM says that that our telephones must be fixed, people expect him to climb the telephone pole so that they can say —see, I told you, he cannot do it.

Our society, particularly its intellectual community, gropes to find problems for every solution in sight. The better always becomes the enemy of the good and the result is analysis-paralysis. Oil seeds and pulses — both are important. Immunisation and a cleaner environment are both necessary. Adult literacy is as important as primary education. Moreover, Technology Missions are taken to represent a point of entry for raising questions in a large number of areas that impact on the missions and have linkages with them. Technology Missions are expected to occupy a small and manageable niche which could then be used to deal with broader policy matters.

It is too soon to judge the impact of the take-off. The missions have been given some visibility, although they are now seen as Pitroda's missions and not as issues in which all of us have a collective stake. This is simply because we are more interested in personalities than in real issues. Even so, there has been some progress in establishing the credentials and credibility of the missions with state governments and district administrations. Interestingly, the major successes on this count have been in non-Congress-I states. This

*He was then working (full-time) on revamping India's moribund telecom network and had, according to many press reports, developed a rapport with the Prime Minister who saw in him a kindred spirit — a 'nuts and bolts' guy. Some have seen in his appointment as Adviser on Technology Missions the end of Sam Pitroda the man who might have made Indian phones work. But this is based on a misunderstanding that Sam Pitroda is actually in charge of implementing the missions. In point of fact, his assignment reflects the poverty of the 'get it done' talent in the system available to an impatient chief executive.

is not just a reflection of the effort of the mission team but also of the receptivity of the governments of these states.

Battling with the deeply-entrenched import lobby that wants India to continue to import vaccines, cold-chain equipment, edible oil and telecom equipment is almost a daily activity. Fortunately, the score so far is in favour of the indigenous technology-wallahs, thanks, again contrary to what people think, to political support at the top. An innovative initiative has been taken following a meeting organised by the Centre for the Study of Developing Societies by establishing a Council for Social Audit of the Technology Missions, comprising independent and concerned citizens. This Council is expected to perform the role of an ombudsman.

On the other hand, there have been disappointments, most notably in the failure to communicate to the people who are being reached as part of the missions what we are attempting to do. Communication oriented towards mobilisation and empowerment has yet to be put in place. Voluntary agency involvement is still at a low level, and people's participation is still only a hope. The level of indifference and cynicism towards the literacy mission is still painfully high. Continuity of management in some of the northern states has not materialised to the extent needed. There have also been other frustrations and it is a fact that the spirit of the mission approach is still confined to a few.

But all said and done, if there was hostile indifference to the missions before October 1987, there is now an amused tolerance. The mission teams are no longer looked upon as Martians. They are now the objects of pity and sympathy, because nobody really expects or believes that the missions will amount to anything significant. That, in the final analysis, is the real challenge for the missions — to make believers out of non-believers and to combat scepticism and cynicism.

The strategy for depending on the existing delivery system at all levels can be criticised. But this is a matter of priority and interpretation. The missions have not seen the reform and overhaul of the system as their primary task. Somewhere down the line, revolution, yes — but if a start were to be made on the premise that the existing system will not work then, frankly, the missions would be purely an exercise in intellectual masturbation.

The system needs to be enthused and motivated. It needs to be coaxed and cajoled. It needs to be pampered and respected. It needs direction and leadership, even by proxy. It needs a sympathetic ear, not abuse and scorn of which it has enough anyway. In the dreaded and much-maligned system, there are a large number of individuals who, given the right stimuli, can make a difference. The latent spark of idealism, concern and sensitivity that burns in those who choose public service as a career has to be ignited and kept alive. Above all, management and monitoring are the key factors. What is required is sustained pressure on the system to be open and accountable.

A common intellectual response to the missions is that they cannot succeed because there is no 'political will'. The days when political will emanated only from the peak or the summit are over. We are now in an age where such will is the result of fermentation, interaction and even conflict at middle levels and layers. Moreover, political will is not a cultural inheritance; nor is it the private preference of one single leader. It is something that can be deliberately engineered. In a consensual and pluralistic democracy, political will is an expression of peoples' determination to overcome the inequities that persist in their environment and to forge ahead. In this way, political will reflects societal priorities.

In essence, lack of political will is a manifestation of the supine nature and apathy of the population, particularly of its intelligentsia. It is necessary to say this because the missions can only strike sparks: it is the people who must nurture the flame. Without community participation, the missions cannot succeed. Self-reliance at the national level and self-help at the local level has to be our credo.

To summarise:

* the missions are very much a part of the Plan agenda, discipline and system. No extra resources have been provided or asked for;
* the missions are not 'extra-constitutional' seats of authority that are subverting the system; on the contrary, they are being implemented by conventional line departments in the Central and state governments;
* the missions are not just a one-man show, whether it be the PM or Pitroda. There is a management team for each mission in the concerned government department;
* the missions represent an attempt at problem solving within the existing administrative framework and the problems being tackled are only a small part of a bigger whole;
* the missions are one way of cutting across departmental boundaries and can be used as entry points for straightening out policies;
* the missions are not meant merely to chase numbers and mechanically achieve targets. Qualitative assessment and conduct awareness generation are important;
* technology in the missions covers a wide spectrum from the traditional to the modern from hardware to software.

II

IMMUNISATION

The main objectives of the immunisation mission are to reduce morbidity and mortality among infants due to diphtheria, tetanus, pertussis, tuberculosis, measles and polio; to reduce mortality due to tetanus among pregnant women; and to achieve self-sufficiency in vaccine production.

Beginning 1990, this translates into covering some 25 million pregnant women with two doses of tetanus toxoid and about 20 million infants with three doses of DPT, three doses of polio, one dose of measles and one dose of BCG

vaccine, all before the age of one year. At present, the measles and polio vaccines are being imported. Indigenously produced measles vaccine will be in use early next year, while indigenously manufactured oral polio vaccine should be introduced some time in 1991. In addition, a major part of the cold-chain equipment that is being imported to store vaccines is also being rapidly indigenised.

The immunisation mission has been broken down into the following packets of work:

* establishment of systems for disease surveillance and epidemiological monitoring;
* linkage with other programmes like ICDS and female literacy programmes;
* special focus on Hindi belt states;
* modernisation of existing vaccine production units;
* strengthening of cold chain maintenance systems;
* special delivery systems for immunisation in urban areas and slums;
* system for enumeration, tracking and registration of pregnant women;
* establishment of vaccine testing facilities in each state;
* use of indigenous systems of medicine in specific areas;
* field testing of new killed polio and quadruple vaccine and strategy for its introduction;
* blueprint for possible campaign approach in areas like western Rajasthan;
* modern methods of training for health workers; better training and supervision to minimise accidents;
* legal rights of parents whose children might die on account of immunisation activity;
* development of measles and BCG vaccine vials with fewer doses;
* use of other networks (dairies, NGOs) in actual delivery;
* increasing proportion of births attended by trained personnel;
* strengthening outreach activities;
* changes in existing practice to increase efficacy — for example, five-dose polio schedule, development of measles vaccine vials with minimum possible doses to reduce risk from reuse of used vials.

The basic challenge in this mission is to expand coverage substantially — almost doubling the present levels. The mission is being implemented through the existing primary health infrastructure. Rough estimates indicate that the total number of cases of all the six vaccine-preventable diseases taken together would be around 40 million if there was no immunisation programme and the expected deaths would be around 1.5 million. While the real and dramatic impact of the immunisation mission will be on morbidity, in some states like UP, MP and Rajasthan, where the neonatal tetanus mortality rates are particularly high, the mission should impact directly on infant mortality rates as well.

LITERACY

The main aim of the literacy mission is to impart functional literacy to 10 million adults in the 15-35 age group, with 2 out every 3 being women. Based on evaluations of the earlier adult education programmes, the strategy followed by the literacy mission is to:

* increase motivation of the instructor and the learner;
* improve learning environment;
* significantly increase the involvement of voluntary agencies;
* improve on-going programme by better supervision and training and greater use of women instructors;
* launch and sustain mass movement by involving schools, universities, ex-servicemen, youth, trade unions, employers;
* institutionalise post-literacy and continuing education;
* ensure availability of standard learning material;
* use of improved technology like better blackboards;
* provide area focus in laggard districts in states where female literacy is low;
* increase political involvement and involvement of panchayati raj institutions;
* increase use of modern audio-visual technology in mobile mode;
* effect development and projection of simple standard themes on benefits from literacy;
* use literacy mission to disseminate information on and increase awareness of development programmes;
* bring district administrations into mainstream of literacy programmes;
* use innovative mobilisation techniques like jathas and traditional folk culture.

The literacy mission is undoubtedly the most difficult, for it has necessarily to be in the nature of a mass movement. For the most part, literacy is considered to be the concern and preserve of education departments in the various states. It is also an abstraction to the illiterate who have to see in being literate a personal gain, not some social good. Thus, evocative programmes to communicate what literacy is all about are critical. The literacy mission is no longer talking in terms of mere enrolment — the thrust and emphasis is on the attainment of an effective level of literacy and numeracy.

Objective evaluation of the learning outcome is central to mission activity. The mission has also to address the issue of awareness building among large sections of the adult illiterate population who are the victims of social discrimination and economic exploitation. Indeed, the real value of literacy would lie in how effective the mission is in making its clientele aware of the generative sources of their disadvantages and in providing a tool for overcoming such disadvantages. This is a tall order, for very few people are really committed to the cause of adult literacy. The generation that was influenced by Gandhiji in this regard is fast becoming extinct. But it would not be an exaggeration to say that India's future hinges on the fate of the literacy mission. No one way is available. Many approaches have to be adopted.

OIL SEEDS

The oil seeds mission hopes to accelerate self-sufficiency in edible oils by reaching a level of around 5 million tonnes by 1990. While the oil seeds mission is strictly an import-substitution effort, it has a strong equity angle in that oil seed cultivation is in the hands of 35 million small and marginal farmers who cultivate predominantly on rainfed lands with poor soil in some of the most backward of areas. The strategy used in the oil seeds mission is similar to that adopted for accelerating self-sufficiency in cereals, cotton and sugar. This involves:

* improved crop technology and release of new varieties to increase yield by 20-50 per cent;
* modern post-harvest processing technology to recover 0.5-1 million tonnes of oil;
* responsive farmer support system for extension, supply of inputs and demonstrations;
* remunerative prices and procurement support;
* tapping new sources of oil (rice bran, cotton seed).

The oil seeds mission recognises that easy and continued imports of cheap oil have had a destabilising impact on the Indian oil seed economy. Since it is founded on the premise that the edible oil problem is not just weather-induced but also, and equally critically, policy-induced, the mission insists on:

* the need for taking decisions on the oil seed economy in an integrated manner so that pricing and import of oil are related to decisions on production of oil seeds domestically;
* increase in PDS prices to levels that would not discriminate against supply from domestic sources;
* discontinuation of supply of cheap, imported oil to vanaspati industry;
* the need to have price bands to protect the interests of the farmer and the consumer, flowing out of which is the need to have market intervention mechanisms to maintain the price bands;
* the need to permit blending of oils and packaging in small packs to prevent adulteration and protect interests of weaker sections of consumers.

WATER

Scientific source finding and development are the major concerns of the water mission. It aims, by 1990, to:

* provide safe drinking water sources in 160,000 problem villages;
* eradicate Guineaworm in 8,800 villages;
* control fluorosis in 8,700 villages;
* control brackishness in 17,500 villages;
* reduce excess iron in 2,900 villages to tolerable limits;
* effect conservation of water and recharging of aquifers by providing remote sensing techniques and hydrological and geophysical surveys.

Problem villages are villages with no water source (including those not yet identified in the Sixth and Seventh Plan lists), villages with contaminated drinking water and villages with a per capita drinking water availability of less than 40 litres per day. The water mission has been broken down into the following major work packets:

* names of problem villages and of villages affected by bacteriological and chemical contamination;
* network of water quality testing facilities at state, district, block and village level;
* use of standards for location, installation and operation of tubewells; implementation of standards through village women;
* upgradation of traditional water conservation structures;
* maintenance plan for assets created; involvement of community for maintenance;
* management plan for specified number of desalination plants, defluoridation plants, excess iron removal plants and conversion of stepwell into sanitary wells;
* development of shallow well handpump;
* legislation for water management and building local pressure for its implementation;
* intensive coverage in tribal areas and districts;
* computerised rig monitoring system;
* source finding in hard core problem villages (approx 10,000);
* special monitoring sytsem for coverage of scheduled caste populations;
* measures to combat problem of short life-span of tubewells;
* scientific inputs into location and construction of water conservation structures;
* hydrogeological and groundwater potential maps for each district;
* special focus on hard rock and hilly areas.

The water mission gained momentum in 1987 on account of the unprecedented drought. The real test of the mission now is to ensure that this momentum is sustained after the recent monsoon which has been good. The problems of supplying drinking water in villages vary from region to region. The geological variation in India is so great that the techniques of water targeting also vary. Based on the problems of supplying drinking water, 55 districts have been identified as part of the mission where an integrated approach to water management with cost-effective techniques which can be easily replicated is being demonstrated.

TELECOM

The objective of the telecom mission is to increase accessibility and connectivity. So far, the emphasis has been on density. For this, the mission has been broken down into six components which aim to:

* improve quality of service;
* increase number of urban public call offices; franchise for their maintenance;
* improve delivery of telegrams so that they are delivered within 12 hours;
* provide telex on demand;
* improve rural communications by commissioning one digital exchange a day;

* build up a national digital network so that all district headquarters are on STD by 1990.

The key factor in the telecom mission has been the introduction of modern digital technology and computerisation. The introduction of new technology is not just a technological issue. New technology has a fundamental impact on the work environment and managerial styles. The telecom mission is vividly demonstrating that the real constraint to the use and diffusion of modern cost-effective technology in India is organisational. Our organisations and management methods are just not adequate for handling future technologies. We can prophecise about the future but cannot capitalise on it because of the way our scientific and technological departments are structured and function.

Modern telecom technology is becoming less hardware-driven and more software- and systems-engineering driven. These are precisely the areas where talent abounds in this country. Apart from this, our traffic and network conditions are totally different from those prevailing in Western countries. Both these factors should dictate a strategy based on self-reliance, which is really the creation and maximisation of value-added jobs in the country itself.

DAIRY

The dairy mission is based on the Anand-marg model: milk producers of a village are organised into a village milk cooperative managed by elected representatives who must also be milk producers. The village societies federate to a district union which are, in turn, federated into a state dairy federation. The Anand model is meant to combine the power of the people with professional management in a vertically integrated structure that links producers and consumers directly.

The first phase of the dairy programme over the past two decades has expanded and grown, basically in response to aggressive and price-responsive procurement and marketing. This has now reached a plateau and further expansion demands technological interventions and the extension of the scope of traditional dairy programmes to cover areas like fodder development, bovine productivity and health, etc. To this end, apart from increasing coverage in both Operation Flood and non-Operation Flood areas to some 1,50,000 cooperative societies (one in every four Indian villages), the dairy mission aims, in the 1988-95 period, to:

* increase average yield of a cow from about 400 litres/year to over 600 litres/year; and of a buffalo from 900 litres/year to around 1,000 litres/year;
* control population of unproductive animal population by castrating 50 per cent of scrub bulls;
* establish 170 district-level diagnostic laboratories to reduce cost of veterinary health care;
* set up domestic vaccine production capacity for combating diseases like rinderpest, foot and mouth disease and theileriosis;
* develop one million hectares of common wasteland for improving fodder availability.

The main feature of the mission and, indeed, the reason why the mission approach is needed, is to integrate the well-established programmes of Operation Flood with state government programmes on animal husbandry, dairying and poverty alleviation schemes like IRDP, and the programmes of a large number of research institutions.

Admittedly, the discussion on each of the missions has been highly abbreviated and almost telegraphic in nature. As pointed out at the very outset, volumes could be written on the individual missions, their functioning, the impact they are having or not having and so on. But the idea in this piece is to give only a flavour of the missions and highlight some work programmes in each. It is easy to be cynical and dismiss the missions as a gimmick or as a way to avoid taking 'hard' political decisions. This paper has tried to argue that this is not the case and that the missions represent a hope and an opportunity that should not be missed.

Immunisation

SATHYAMALA

THE national Technology Mission on Immunisation sets out to cover in a phased manner a target population of pregnant women and infants (children under one year of age) with immunisation against the six vaccine-preventable diseases of childhood. Considered a 'non-controversial' programme of the government, the amount of publicity and support received by the mission has resulted in the acceptance of the selection of these six vaccine-preventable diseases and the choice of technology for dealing with them as rational and in the interests of the children it aims to serve. In other words, what is implied is that the six diseases selected by the mission are the most important causes of death and morbidity among children and immunisation the most effective method of reducing them.

The Technology Mission on Immunisation, which aims to achieve 90 per cent coverage of pregnant women and 85 per cent of infants by 1990, has as its objectives a reduction of morbidity and mortality due to diphtheria, whooping cough, tetanus, poliomyelitis, tuberculosis and measles among infants and a reduction of mortality due to tetanus amongst pregnant women.*

It is unclear why the second objective of reducing mortality due to tetanus amongst pregnant women was included because the two doses of tetanus toxoid administered during the antenatal period are meant to reduce neonatal tetanus in the new-born and not in the mother, as tetanus does not form an important cause of death in women in the post-partum period.[1] The mission is thus left with a single objective of reducing mortality and morbidity due to the six diseases in

*The third objective of attaining self-sufficiency in vaccine production cannot be considered a separate objective as it forms a supportive one for the first two.

1. Department of Family Welfare, Ministry of Health and Family Welfare and Department of Biotechnology, Ministry of Science & Technology (GOI), 'National Mission on Immunisation', 1988 p. 21.

infants and the first question that the missionaries need to answer is how important these diseases are in causing death and illness in the under-five population group.

There are no authentic studies to show the general pattern of morbidity among under-five children in India. What everyone does seem to agree about is that the infant mortality rate in India is high (estimates vary from 105-220/1,000 live births). According to the survey of causes of death in infants (rural) conducted by the Registrar General and quoted in the booklet on the National Mission on Immunisation, prematurity, respiratory infection of the new-born, followed by diarrhoea, none of which is a vaccine-preventable disease, account for approximately 65 per cent of deaths among 'causes peculiar to infancy'.[2] Figures available from other surveys on the pattern of mortality are generally localised to specific areas and are often clinic-based and therefore cannot be generalised.

However, by putting together the little data available on the mortality pattern of the under-five population, it can be concluded that the major causes of mortality in this population group are diarrhoea followed by respiratory infections which, together, account for approximately 60-90 per cent of mortality.[3] A survey of national causes of death in longitudinal surveillance shows that approximately 2 per cent of infant and 10 per cent of pre-school deaths are caused by measles. Punjab showed a slight variation because of the higher incidence of neonatal tetanus.[4] Thus measles and tetanus, both vaccine-preventable diseases, although the third most frequent cause of death, account for less than 10 per cent of deaths in the under-five population group.

On the basis of the mortality statistics available, if we exclude deaths due to gastro-intestinal infections and respiratory infections, we are left with a small proportion of other causes among which vaccine-preventable diseases are important. Thus, the selection of the six vaccine-preventable diseases which account for barely 10-12 per cent of the total deaths in under-five children as the most important set of diseases to be tackled at the national level cannot be justified epidemiologically.

Even if we bypass the rationale for selecting these six vaccine-preventable diseases, the next question the missionaries need to answer is on what basis was *immunisation* chosen as the most effective method for tackling them. For instance, measles in a healthy child is a negligible disease but mortality due to measles is 400 times greater in an undernourished population and the spread and severity of the epidemic is directly linked to overcrowding. Similarly, if an adequate amount of protected water supply is made available, poliomyelitis will cease to be a problem.

Immunisation is only one of the ways by which these diseases can probably be prevented. We say *probably* because nowhere in the world has a technology mission of the kind envisaged been effective in reducing morbidity and mortality due to these diseases. For instance, in the US, medical technology for each of the nine infectious diseases responsible for the major proportion of deaths developed *after* a major decline in mortality and morbidity had already taken place. Medical interventions for tuberculosis and measles were introduced when the death rates for each of these diseases were already negligible. Medical interventions for diseases such as diphtheria, pneumonia, whooping cough, poliomyelitis, etc., were introduced when the death rate for each of them was still high.

However, none of these death rates, except in the case of polio, showed the sharp decline that would have been expected if medical intervention had had an impact. In fact, it has been estimated that only 3.5 per cent of the decline in mortality due to infectious diseases took place because of medical interventions.[5]

The smallpox eradication programme, which is probably the only success story of an effective application of medical technology on a global level, cannot be used as a comparable case. Initially, when the programme was being run along the lines of the immunisation programme currently envisaged, aiming at 70-90 per cent coverage with vaccination, it did not have the desired effect. It was only when the strategy was changed to locating and isolating the cases and containing the outbreaks by a sort of military operation, that the disease could be eradicated.

But the strategy that was effective in the case of smallpox eradication is not necessarily what will work for other diseases and the uniform application of a single strategy will not be equally effective in all cases as each disease has its own epidemiological pattern of behaviour. For instance, unlike the smallpox vaccination which could be given at birth, to interrupt the transmission of measles, the age at which children are to be immunised (between 9 and 12 months) is extremely crucial. There are other essential differences, but it is sufficient to say that the confidence with which the programme is being launched as *the* effective means of achieving the objective could very well be misplaced.

Even if we accept the logic of the Technology Mission that immunisation is the most effective way of dealing with the selected diseases, the third question the missionaries need to answer concerns the expected impact of the programme on the natural history of the diseases in our country. As stated earlier, we have no authentic studies on the morbidity and mortality pattern of under-five children. The data available through the passive surveillance system is hardly adequate to be considered baseline information. The impact of the immunisation mission on the diseases selected cannot be measured without baseline data, an essential prerequisite

2. *Ibid*, p. 20.

3. Mortality Patterns in Under Six Children in ICDS Slums, *Indian Paediatrics*, 23: August 1986, pp. 617-622.

4. Steinhoff M. & John T. J., Appropriate Strategy for Immunisation of Children in India IV: Measles and its Control, Priority Number One, *Indian Journal of Paediatrics*, 49, 1982, pp. 303-310.

5. Conrad and Kern (eds.), Mortality rates in US between 1900 and 1970 and the fall in standardized death rates for nine common infectious diseases in relation to specific medical measures for the US, *The Sociology of Health and Illness*, New York, St. Martins Press, 1981, pp. 19-25.

if changes in incidence are to be compared.

The programme is thus going to monitor its performance not by measuring the impact on mortality and morbidity rates but by assessing percentage coverage of the target population. Even from a managerial point of view, this criterion of assessing performance cannot be accepted because the objective, as set out by the missionaries, is to reduce mortality and morbidity due to the six vaccine-preventable diseases and not to merely increase coverage of vaccination, since the latter is important only as far as it helps in achieving the former objective. Apart from the overall percentage coverage with the vaccine, it is also important to assess uniformity of coverage, percentage coverage of eligible population and the potency of vaccine at the time of use.

The past record of the Extended Programme of Immunisation (EPI) and the Universal Immunisation Programme (UIP), from which the Technology Mission draws its inspiration, has been dismal. The immunisation programme during 1975-79 showed an extremely low percentage of coverage with tetanus toxoid (TT) of pregnant women at 16 per cent and diphtheria-pertussis-tetanus (DPT) upto 18 per cent. The situation improved somewhat during the years of the EPI to DPT—30 per cent, oral polio vaccine (OPV), 27 per cent, and TT, 39.3 per cent. The coverage during the first oral polio phase of the UIP (1985-86), despite enormous inputs, showed that of the 30 districts in which the programme was implemented, 11 registered no significant progress; 14 evinced some progress but not sufficient on an epidemiological basis; and only 5 districts recorded the necessary achievement.[6]

This particular experience is to be noted carefully because the UIP was launched on 19 November, 1985, as a 'living memorial to the memory of our late Prime Minister, Smt. Indira Gandhi'[7], which meant that the much talked about 'political will' would have been at its firmest. Also, since only 2 districts from each state were to be chosen, the district with the best infrastructure facilities must have been selected. Despite these two extremely favourable factors, the coverage in the UIP districts during the first phase has been far from encouraging.

Even in the best districts, where optimum coverage was achieved, it is very likely that the coverage was not uniform with pockets of a much lower coverage scattered in the area. Such pockets are highly susceptible to severe outbreaks of epidemics because the herd immunity due to the natural process of the disease is destroyed. This is precisely what happened in Tampa, Florida (USA). In a successful mass vaccination effort, 94 per cent of the estimated susceptibles (26,200 children) were reached on a single Sunday in January. In March, a survey of a stratified random sample revealed that in reality, barely 80 per cent of the target group had received vaccine and that 20 per cent of the remaining susceptibles were largely geographically clustered, with 70 per cent susceptibility in some areas. In April, measles hit these clusters of susceptibles.[8]

In a population that is dependent on an immunisation programme for its immunity, the natural processes of immunity are destroyed if the immunisation effort is not continuously maintained. A spectacular immunisation effort, if not well followed through, can produce an equally spectacular epidemic. High immunisation levels achieved briefly only temporarily suppress the transmission of disease. Newborns can then accumulate as susceptible children until disease transmission again becomes easy. It is at this point that an epidemic may explode.[9] This was the case in Singanikuppam village in the Tindivanam taluk of Tamil Nadu, where a severe outbreak of measles with a high fatality rate occurred *two years* after a successful immunisation programme for measles.[10]

Concern has also been raised about the possibility of an outbreak of paralytic poliomyelitis following a partial or even a successful mass immunisation programme. It has been observed in the past years that there has been a paradoxical increase in the incidence of polio in areas where a large amount of polio vaccine is administered annually. In Bombay, coverage with OPV was found in 37 per cent of school children of standard IV, 46 per cent in standard III, 47 per cent in standard II and 54 per cent in standard I. Contrary to expectations, the incidence of polio has been steadily increasing in Bombay. A similar situation has occurred in Delhi, Ahmedabad, Madras and Trivandrum, all of which are urban centres.

Dr. T.J. John of the Virology Unit, Christian Medical College (CMC), Vellore, explains why partial coverage not only fails to cause a proportionate reduction in incidence but also apparently results in increasing incidence. In the natural course of events, only a small proportion of infants and children infected with polio viruses develop paralytic illness. Susceptibility to paralysis is determined by genetic predisposition, age at infection and immune status, a fourth factor being iatrogenic, namely, intramuscular injections.

Susceptibility to paralysis increases with increasing age at first infection. Infection when the infant is very young, with immunity passively acquired through maternal antibodies, does not cause paralysis. Therefore, in unimmunised communities, intensive poliovirus circulation is advantageous since infection would occur early. In the passively immune, infection will induce active immunity without risk of the disease. In others, as age is low, infection is attended by low risk of paralysis. Thus, in these communities,

6. UNICEF, Universal Immunisation Programme (UIP), India: Proposal for Supplementary Funding, 1987-1989, December 1986, p. 24.

7. Departments of Family Welfare/Biotechnology, *op. cit.*, p. 3.

8. Prather, E.C., Assessment of Immunisation Levels: A Problem, presented at SIMS Conference on Epidemiology, Alta, Utah, July 8-12, 1974.

9. WHO/UNICEF, Planning Principles for Accelerated Immunization Activities, A joint WHO/UNICEF Statement, Geneva, WHO, 1985, p. 17.

10. From the Editor's Desk, *MFC Bulletin*, No. 126, March 1987, p. 8.

the incidence of paralysis would necessarily be low.

The increased incidence in partially immunised communities could be due to the passively immune infants escaping infection only to become susceptible to the risk of paralysis outside the umbrella of protection afforded by maternal antibodies, the age at first infection may be rising subtly resulting in increased incidence in older children and there may be an increase in the frequency of I/M injections which, coincident with infections, may provoke paralysis.[11] According to a study conducted in Pune, 90 per cent of the eligible children population in the slums were immunised against polio in 1983. The number of patients admitted to the paediatric ward showed a sudden increase from 1983 (44) to 1984 (84). The study concluded that in order to eliminate poliomyelitis from the community, 100 per cent coverage of children below one year is absolutely vital and the number of OPV doses should increase from 3 to 5.[12]

There are other major problems that could be caused as a result of wide-scale immunisation without proper sterilised equipment. According to the EPI bulletin, the immunisation teams in India are given 2 syringes and 40 needles each, and about 40 children are immunised each day with the same unsterilised syringes and needles. As a consequence, there is a high incidence of injection abscesses. The possibility of spreading blood-borne diseases, such as hepatitis B and malaria, is equally high. It is estimated that 4 per cent of our population are carriers of hepatitis B and the incidence of serum hepatitis in post-vaccinated children has been found to be as high as 10-15 per cent.

Even if all the problems just mentioned are ironed out, the final question that the missionaries need to answer is, why a *mission* on immunisation? In 1942, the national movement compelled the British government to come out with a scheme for health for all. The Bhore Committee, which presented its report in 1946, repeatedly emphasised the fact that the ill health of the Indian people was a result of their poverty and an improvement in their health status could not come about in the absence of better living and working conditions. The plan for health service development was drawn up in this context.

But the past forty years of experience has shown that the proposed plans were scuttled despite the fact that the several committees that sat down in the succeeding years to review the health situation in India reiterated the perspective and plans of the Bhore Committee. This has finally culminated in the signing of the Alma Ata declaration and in the publication of the joint report of the ICSSR and ICMR on 'Health for All'.

Yet, today, a Primary Health Centre serves a population of a lakh or more; many of the posts, especially of the female health functionaries, are lying vacant; in rural areas, there is one doctor for a population of 12,500 (although we have a surplus of doctors) and one hospital bed for 9,000 (Maharashtra) to one for 1,04,000 (Bihar) population. The per capita expenditure on health in 1979-80 was Rs. 19.9 (all-India) and the per capita per year health expenditure in the rural areas was approximately 20 paise (sufficient to buy 2 asprins!). The female health workers, who form the backbone of the mother and child health services, have 180 days per year for regular visits to the village and during that period have to perform 11 major tasks divided into 41 sub-tasks, which gives them barely 20 minutes per house per year in their area.

But this has not been so in the case of programmes which, for whatever reasons, have had the support of the national and international experts: whether it be the national malaria eradication programme, the smallpox eradication programme or, since the mid-seventies, the population control programme. These programmes have been nurtured at the cost of the provision of primary health care along the lines envisaged by the Bhore Committee. This has not been solely in terms of diverting material resources to these vertical programmes but, as anyone who has witnessed the functioning of rural health services at close quarters knows, the last few years have seen the paralysis of not only primary health services but other rural administrative services as well.

It is estimated that a total of Rs. 240 crores is going to be spent on the National Technology Mission on Immunisation. This amounts to 55 per cent of the amount allotted for control of all the other communicable diseases in the Seventh Plan. Although it is repeatedly stated that the mission is not going to be a vertical programme, and that it is going to be implemented through the existing health care services in the country, the emphasis it has received shows clearly that it is going to be *the* programme in primary health care, perhaps only next to the population control programme in importance. In fact, we hear that the population control programme, too, is going to be turned into a mission, as though it was languishing for want of attention.

The six vaccine-preventable diseases form a small proportion of diseases which cause death and illness in the under-five population. Both diarrhoea and respiratory infections, although the most common causes of death, are multifactorial in etiology and not preventable by vaccines available today, and an attack on these diseases is not possible without an attack on poverty. On the other hand, immunisation is a biotechnology which can be implemented on a wide scale without the need to challenge the social and economic causes of disease. Therein lies its attraction. Immunisation, which is necessary and important at the level of an individual child, and is an essential component of primary health care, cannot be allowed to become the political weapon it has or to supersede the other important components of primary health care.

11. John, T.J., How Shall We Control Poliomyelitis, *Indian Journal of Paediatrics*, 48, 1981, pp. 565-68.

12. Phadke, M.P. et al, Poliomyelitis in Pune vis a vis Immunization in Urban Slums, *Indian Paediatrics*, 23(5), pp. 351-354.

Mr. Pitroda goes to Sunder Nagari

RITU PRIYA

IN more ways than one, last year's cholera – gastroenteritis epidemic in Delhi highlighted in concrete terms the poverty – ill health complex and the limitations of the current medical approaches to the management of the situation.

One must first observe that it was actually a multidisease epidemic, in which deaths occurred at a high rate, especially among children. Gastroenteritis and its special variant, cholera, made their appearance first. Others, like typhoid and polio, followed later — only because their incubation periods were longer. The gastroenteritis epidemic assumed public importance because it was accompanied by the terrorising label of 'cholera'. But it is evident from hospital data that not more than ten per cent of the gastroenteritis cases were actually of cholera. Outside the hospital, in the community at large, their number is likely to have been even less.

Statistics reveal that 307 died in hospitals, but whether of cholera or simple gastroenteritis we do not know because data regarding them is difficult to obtain. But as attending doctors and a brief survey in the community revealed, most of the children who died were already malnourished and suffered from chronic diarrhoea. They later had pneumonia or bronchitis, septicemia, etc., accompanied by another bout of gastroenteritis. These were the ones who could not be saved, even in hospitals. Only in very few of the cases which reached hospitals was simple dehydration the cause of death. Like the epidemic, these deaths marked the final crisis point in an already explosive health situation.

The epidemic primarily struck the 'resettlement' colonies of the emergency period and the unauthorised jhuggi-jhopdis in which Delhi's 'urban poor' live — the rag-picker, the daily wage manual labourer, the small-scale vendor, the peon in an office. In these areas there is almost no outlet for garbage or excreta except the open *nalis* running in front of each row of houses. These are constructed such that they often flow backwards and overflow into the streets and the houses. The public latrines are attached to septic tanks which, when cleaned, only release the decomposing mess inside into the open drain! Most often, of course, they are not cleaned and their contents just overflow. The personnel who clean the streets and *nalis* are ill-equipped and anyway, they merely collect all the dirt from the street and transfer it to open spaces close by. There is no functioning system to remove this garbage regularly and dispose of it in a safe manner.

The public taps, one to a lane, are generally dry and so the only source of water is the handpumps. These are either private installations by individuals or provided by the DDA. Being shallow, they merely bring up water contaminated by excreta. Thus all the excreta and filth and water of the area are mixed and cycled and recycled over and over again in a closed system which has points for entry but almost none for exit.

It is in such environmental conditions that twelve lakh residents of

the resettlement colonies live. (The conditions for another eighteen lakh people of JJ colonies and unauthorised colonies are even worse). Accustomed to open spaces in their village, these people defecated in fields situated at a reasonable distance from the wells, the source of water in the villages. The lack of such spaces in the city, the inconvenience caused by all the slush and their urban 'education' makes them line up every morning in the long queues outside the public latrines: dirty, stinking areas demarcated for the purpose of defecation.

The situation cannot be otherwise when the latrines are so few in proportion to the users. A survey conducted by the Sabla Mahila Sangh, a local women's organisation, revealed that there were 108 persons to a toilet seat in Sunder Nagari. That water-borne diseases, especially those spread by the faeco-oral root — diarrhoea, dysentery, typhoid, infective hepatitis and polio — are rampant in these areas is therefore not surprising. It is in the light of these well-known but generally ignored facts that we need to examine the management of the health problem in such a persistently endemic situation.

The obvious and non-controversial measures that can be taken in this regard are: (1) ensuring a safe water supply in adequate quantities; (2) effective excreta disposal; (3) cleaning of drains and gutters; (4) hygiene education; and (5) provision of appropriate medical care. These would have been equally relevant for the control of last year's gastroenteritis/cholera outbreak. The additional measures that would have helped in this context are cholera vaccination and the popularisation/dissemination of information about oral rehydration. Since the measures to be taken were obvious, what this outbreak underlined is the wasteful and counterproductive nature of our priorities.

It is universally accepted that providing a safe water supply and ensuring environmental sanitation were the two basic steps that should have been taken. However, planners, administrators and most community health experts felt these tasks were too big and 'impossible'; vaccination, the only preventive 'medical' technology available, seemed the only measure possible to implement 'effectively' and was therefore justified. This in spite of the fact that the cholera vaccine *per se* is known to be well nigh useless after an outbreak has occurred. Even if the vaccine were effective, it should have been used only to supplement the first two steps because of the other water-borne diseases that could follow in the wake of an gastroenteritis outbreak.

This brief event showed up clearly the limitations of our choice of priorities and their resultant emphasis in practice as well as in our process of planning. On the basis of newspaper reports, conversations with some administration personnel and reports from the residents, we shall attempt to piece together the governmental measures adopted to deal with the situation. While keeping the overall picture of Delhi in view for a detailed look at the conditions and the measures taken, we will focus on Sunder Nagari, an extension of Nand Nagari and an area which received VIP attention, i.e., a concentration of control measures. It was later cited as an area where successful control measures were implemented.

From the middle of May 1988, reports of cholera cases and deaths started coming in from various parts of Delhi and its neighbouring states. However, the Delhi Administration and the MCD acknowledged that the situation was worse than the 'normal' years only in the middle of June and only after that did they gear up to 'start' a drive against gastroenteritis.

Until 22 June, when the Prime Minister visited Nand Nagari, Sunder Nagari and other affected areas and an 'action plan' was drawn up, all the measures undertaken were *ad hoc*. There was no overall plan or strategy for controlling the outbreak, no coordination among various agencies, and efforts were on a low scale. But elements of almost all measures needed were already present — para-medical teams out in the community to detect cases and data coming in from hospitals and laboratories. Thus, the possibility of investigating the epidemic for quick useful information already existed.

General causes had been identified; teams were carrying on hygiene education and ORS promotion in affected areas; attention was being given to water supply and stagnant drain water; and a vaccination drive was in progress. What was lacking was any effort at providing treatment facilities on an emergency basis right in the affected areas and efforts at improving excreta disposal. What was needed was an overall strategy for control of the outbreak and another for long-term improvements, and the coordination of all the agencies concerned.

After the PM's visit, the usual flurry of action followed. Within a few hours, a comprehensive 'action plan' had been drawn up. Joint meetings were held of the various agencies to coordinate implementation of the action plan. Both vital steps, sorely needed. But what was the action plan? It included eight (eleven by some reports) points. The emphasis, however, was on vaccination (nine lakhs to be vaccinated within a week), cleaning up (deadline set for a week, later extended to a fortnight) and the installation of permanent drinking water facilities (within 15 days).

We have already discussed the 'usefulness' of vaccination. However, cholera vaccination was projected as 'the saviour' of the hour. The school health staff, which was doing sound work promoting ORS and undertaking health education, was forced to undertake 'Operation Immunity'. ORS promotion suffered as a consequence and health education had to be abandoned for some time.

The cleaning up was obviously not meant to cover all the resettlement and JJ colonies of Delhi. The amount of filth collected over years could not possibly be cleared in a week, or even in a fortnight, especially where outlets are few and blocked. If Nand Nagari was all that was meant to be covered, what was the action plan about? And if

it was an overall plan for Delhi, how realistic was the planning of targets and deadlines? Effectively, at least, one can see that Nand Nagari and its surrounding areas were the only ones to benefit.

Cleaning up operations included garbage removal, laying bricks in lanes and roads and cleaning drains and gutters. In Sunder Nagari, garbage removal was effective to a large extent, though instances of just transfer from one place to another also occurred. Over 2,000 truck loads of garbage were removed from one area. But garbage removal does nothing to break the faeco-oral cycle. It only removes visible dirt and gives relief from the all-pervasive stench. The more effective measures, clearing drains and establishing flow in them, were achieved by taking out the top layer of slush and plastering it on the road, then covering the rest of the filth in the *nali* with bricks and some cement.

The new lining made the *nalis* appear clean and one expected the water in them to flow away. But the water flowed backwards! And even when it did flow forward into the bigger drain, the latter only spewed out all its contents into an open space nearby because it had no further connection. Instead of ensuring the effective working of drains, greater emphasis was placed on covering all of Sunder Nagari's lanes with bricks. As the residents complain, all the filth has been covered up only to eventually seep into the soil.

Let us consider the third major effort, the installation of a permanent water supply. A laudable step, indeed. But when there is a fire raging, does one start to dig a well? It is not as if other means of supplying safe water were not available. The fact that so many thousand new private connections were sanctioned/installed *and* received a continuous water supply can only lead one to conclude that either the plea that 'vaccination was justified because ensuring safe water is not possible' is just not true or, if true, then this kind of centralised water supply to all resettlement and JJ colonies is not possible and therefore not the solution. Nor is it a 'permanent' solution even for Sunder Nagari. What was the alternative available? Based on information available from residents and by observation at the site, a possible alternative can be deduced.

Each lane in Sunder Nagari had two taps supplied by local tubewells through a pipeline. Most houses also had their own handpumps, generally shallow ones. As the tubewell supply was erratic (often two to four hours in a week, according to residents), the only recourse was the handpumps. Supply in these two taps a lane could have been ensured immediately, with adequate chlorination of the tubewells. Instead, in the initial stages, tankers of water in inadequate numbers came and stood on the main roads of the colonies. The taps too received water for a few hours every morning. But by the afternoon both the taps and the tankers were dry, and the residents were again forced to use their handpumps (painted red by civic authorities as a warning!).

Within a couple of weeks, 'foolproof' steps had been taken. All those who had filled forms (collected by personnel of the water supply department door-to-door!) and paid the requisite amount were given individual water connections from the main water supply. Those who did not fill the forms were also the ones who could not pay the required Rs. 115. They were, of course, also the ones whose children were more malnourished and therefore had greater chances of getting ill, of manifesting severe symptoms and of dying. The administration catered to them as well, providing one (deep) handpump and one tap per lane.

However, according to official reports, even these deep handpumps were bringing up contaminated water and so bleaching powder was put in. As a long-term measure, one is certain that chlorination of each handpump will not continue for long. One is also in sympathy with the residents who had not removed their shallow handpumps in spite of individual connections because they were not sure how long this 'luxury' would last. Due to good rainfall and the coming elections, there is still a continuous water supply. But it is not far-fetched to presume that when water shortages occur, these 'VIP' areas may be the first to have their supply curtailed or even stopped.

Tapping the local, easily available, abundant underground water in these areas and small systems of purification and supply would be more appropriate. In areas like Sunder Nagari, which already had the requisite infrastructure, what was needed was that it be activated and that its continuous working be ensured. More taps, private and public, could have been installed at a later time, simultaneously increasing the capacity of these systems.

So much for 'control' and 'prevention' measures. As far as treatment goes — oral rehydration is the primary step. While promotion of oral rehydration was undertaken, the focus was less on home-made solutions than on premanufactured packets. However, for cholera patients and for those who are already ill or malnourished, there is also a need for intravenous rehydration. This is a simple therapy, and yet there were over 300 dead by official hospital records and that, too, not in a remote rural area but right in the middle of the capital city.

Though field staff is not available in the city health services, there is a network of dispensaries which could have been mobilised to provide treatment to patients within easy reach. An effective treatment centre in the colony and a hospital, even two kilometres away, could mean all the difference between life and death to the child of a poor nuclear family with both parents having to go out to earn, leaving the child at home with an older sibling.

Health education, certainly a need and powerful if undertaken sensitively, again cannot be one of the main planks of a control strategy until the requisite resources/facilities to implement the 'messages' are available. In an area with over a 100 persons per toilet seat, education about not defecating in the open makes little sense.

The residents of Sunder Nagari perceive the futility of the action taken, its nature and the quality of work done. This only confirms their

feeling that the whole operation was meant only for votes, for popular appeal. Whether right or wrong, this belief in the authority's vested interest, the lack of trust, make them question all that they are told.

It seems safe to conclude that the management of this water-borne epidemic was futile, even a failure. It is necessary to ask why this failure occurred — considering that public health experts perfected and began practising this management a decade ago.

The question that confronts us is, what can a Technology Mission learn from the management of such an epidemic? One is reminded of Forster's 'only connect'. One has to see the linkages between various missions, whether of health and water, or health and nutrition as in the oil seeds mission. Second, the notion of the community seems refractory to most management experts. And third, a Technology Mission must provide a more strategic place to public health workers and absorb their experience, utilising their links for something more than family planning assaults on the community.

In this connection, it is important to point out that at least amongst some of the health workers involved in the Sunder Nagari project there was an awareness of the futility of the exercise. In the words of one of the workers, 'We know this vaccination is useless and still we are going on giving it. We give what we receive — vaccine against 'classical' cholera, 'el-tor' cholera, whichever — without even knowing which strain is involved in this outbreak.' Closer contact with the people made for the realisation that the absence of basic amenities in the community makes a mockery of their 'medical' solutions. Fulfilling targets becomes important and the notion of a work ethic declines, especially where pressure is applied. Our National Family Welfare Programme and the large-scale immunisation programme are examples of such failure, partly due to this reason.

The correctives for this situation can therefore only start at the planning level. Use must be made of the field workers' insights into problems and solutions. Even the administrators are forced into a situation of accepting plans they do not agree with because of political pressure. Pushing the 'action plan', especially its 'Operation Immunity' aspect, is one instance of this. It was released to the press before those meant to execute it even knew about it.

This strategy of bypassing existing structures may yield immediate results. For instance, it became possible to give out figures in lakhs of vaccinations done, and so to convey the impression that efforts were on a war footing. But the long-term implications for effective administration are only negative. This tendency to reject existing structures or resources as useless and bypass them goes down the line. A different kind of example is the failure to utilise the existing water supply system in Sunder Nagari. Another is the failure to use dispensaries existing in the localities themselves.

Priorities set during the planning process and then at the administrating level clearly show up a factor which set them askew. Even with the best of intentions, the lack of appreciation of the living conditions of the poor due to the almost total absence of any real contact with them leads to faulty planning.

This is probably at the core of what has led to the decline in public health practice, the results of which we saw clearly in this event. That which calls for difficult action is best ignored and allowed to die a natural death. It is much easier to look for quick technical solutions within the 'medical' framework. Vaccinating lakhs of people within a few days is much easier than giving them safe drinking water or an effective excreta disposal system. Even our community health experts have imbibed this notion of 'not possible' so well that they do not even attempt to look into basic problems and solutions. Appropriate management would mean that public health expertise is promoted actively in practice and not bypassed as happened in this case.

Oil seeds

C. GOPALAN

THERE can be no doubt that the augmentation of the production of oil seeds and of edible oils is a desirable objective. According to the figures available, we now produce 3.44 million tonnes of edible oil within the country, and import an additional 1.1 million tonnes. The estimated availability of vanaspati (hydrogenated fat) is 0.9 million tonnes (*Economic Survey*, 1987-88). The per capita availability of edible oils, even taking import into consideration, works out to no more than 16 gallons a day. The intake of fats in the dietaries of large sections of our people is very low. It can be argued that, under the circumstances, the incorporation of fats in these poor dietaries will increase their caloric density and, possibly, palatability.

Cereals, which are the staple of Indian dietaries, provide significant amounts of (invisible) fat, adequate to meet the physiological requirements of essential fatty acids. While it is true that poor Indian dietaries will stand to benefit both with respect to calorie density and palatability through higher levels of intake of edible oils, there is no demonstrable specific evidence — clinical, functional or biochemical — of fat deficiency, even in the poorest segments of our population. It has also been shown that even

with current levels of fat intake, B carotene absorption is not seriously hampered. So, purely from the point of view of basic physiological need, augmentation of fat intake (though desirable in the case of the dietaries of the poor) cannot be considered as of the highest nutritional priority.

The reality, however, is that with respect to dietary fat — more than, perhaps, with respect to any other food item — there is vast divergence between 'needs' (as assessed on the basis of minimal physiological requirement) and 'wants'. The 'wants' of the poor cannot find practical expression in the form of increased intake, but those of the affluent not only can (and often do) but also sometimes get such free rein as to pose a serious health hazard to the consumer. The case for a Technology Mission on Oil Seeds seems to rest almost entirely on the consideration that today we spend several millions in foreign exchange for the import of edible fats.

Because of the prevailing inequalities in income, inequitable distribution of practically every food item among the population is to be expected. Thus there is the cruel paradox of having vast buffer stocks of cereals while considerable segments of the population subsist on cereal intakes far below recommended levels. Distributive injustice is perhaps most marked with respect to edible oils with this important difference: that the real victims of (or sufferers from) such distributive injustice in the case of fat intake are the affluent and not the poor — a case of poetic justice born out of blatant distributive injustice!

On the basis of the surveys carried out by the NNMB in both rural and urban areas of the country, it can be estimated than 40 per cent of all edible fat currently available in the country is being consumed by just 5 per cent of our total population (20 per cent of the urban population) who constitute the 'urban rich'. There has been an alarming increase in the incidence of coronary heart disease among our urban populations in recent years. It may be an over-simplification to suggest that such increase is directly (or perhaps even predominantly) related to excessive fat consumption; but excessive fat consumption is certainly an important factor. While in the USA and Europe, vigorous efforts at reducing intake of dietary fat are beginning to yield results in the form of reduction in the incidence of heart disease, in India, our major national effort seems to be confined — at least for the present — to augmenting our availability of dietary fat.

A recent study by Gopinath and colleagues (N. Gopinath: R.J. Vakil Memorial Award Oration, 1987) showed that on the basis of clinical examination and ECG, the approximate prevalence rate of coronary heart disease in urban Delhi was 7.3 per cent, meaning that there were at least 2,19,000 subjects currently suffering from the disease among the 30 lakh of urban population in the age group 25-64 years. It was also estimated that, annually, at least 8,100 new cases were being added to this number. It was also observed that most subjects with established evidence of coronary heart disease belonged to the higher income brackets of the urban population. Data from the rural environs of Delhi are still being analysed but the preliminary indications are that the problem in rural areas is of a relatively insignificant proportion, the prevalence rate being just above one-sixth of the urban.

The question that arises then is: whom does this particular Technology Mission benefit? Certainly not the poor because in any case, as matters now stand, they cannot buy the oil; indeed 40 per cent of them cannot even buy the less expensive cereals in amounts that they need to meet their bare energy requirements. It will help the rich to satisfy their 'wants', but certainly not to ensure their better health. It may, to a certain extent, help the urban middle classes to obtain a bit more edible oil to meet their modest needs. It may help to save foreign exchange by cutting down imports if indigenous production is in fact stepped up. It may thus improve India's overall economic position to some extent. Oil-seed meals can no doubt augment available protein food resources and can find several important uses, but we suspect that a good part of them is being exported as cattle feed to Europe.

It seems, however, unlikely that augmentation of edible oil availability, given the present inequalities in distribution, will help solve any of our current major health and nutritional problems. We are not arguing against the augmentation of oil seed production. We emphasise that such a programme will be meaningful only if simultaneous vigorous attempts are instituted (as an integral part of the same mission) to:

* Reduce current glaring inequalities with respect to availability and consumption of edible oil as between rural and urban areas. Fair price shops which exist only on paper in rural areas must become functional. The possibility of making edible oil available to poor ration card holders must not be confined to urban metropolitan areas only.

* There must be an intensive programme of health education beamed to the new-rich, highlighting the dangers of excessive consumption of fat. A level of fat which provides anything more than 20 per cent of the total calories required should be considered as clearly unnecessary and unhealthy; in fact, it may be prudent to aim at keeping edible oil intake down to less than 40 g per CU per day, since there are other sources of fat apart from edible oil in the diet. This must also become part of the 'health education' programme in schools which cater to the children of the affluent, because dietary habits ingrained in childhood are hard to change and in any case, much of the damage may already be done in childhood and adolescence.

We must learn from the mistakes of the technologically developed countries of the West. It will be far better to start now on an intensive programme designed to educate the affluent (and their children) to restrict their fat intake than to wait for the problems arising from excessive fat intake to reach even more alarming proportions than at present.

Dairy development

ASHOK THAPAR

IF India is to be provided with cheap and abundant milk in the 1990s we must get ready to make a clean break from some of the basic notions that have underlain agricultural planning in the last 40 years.

The single-most important such notion which now needs to be overhauled is that the development of modern, efficient, low-cost land-based dairying in India has so far had to be kept in check because the country could not allow valuable acreage to be diverted from the overall national aim of increasing the production of foodgrains to other uses such as the production of fresh green fodder round the year.

There could be no quarrel with this notion for as long as India remained in the grips of an acute shortage of cereals, as was the case in the 1960s and the earlier part of the 1970s, before it became clear that the Green Revolution had made an abiding impact on the production of foodgrains in this subcontinent.

As matters stand, annual output has moved up from less than 70 million tonnes before the Green Revolution to almost 170 million tonnes. Underlying this, there has been a dramatic increase in the area covered by irrigation. The subcontinental cropping pattern too has undergone a radical change. Areas such as Punjab and Haryana, which used to be primarily producers of wheat, have become leading producers of paddy. On the other hand, parts of West Bengal and Bihar, for example, which were traditionally producers of rain-fed paddy, have now emerged as producers of *rabi* wheat.

What is more, the new technology underlying the use of high-yielding seeds continues to percolate to newer strata in the countryside each year. In other words, what had been unfairly classified as 'rich farmer technology' a couple of decades ago, has gradually established itself as an improved technology which is universally being put to use by all classes of farmers, big or small.

The gradual adoption of the high-yielding techniques by poorer and smaller farmers is a development of crucial importance. This category of small and poor farmers is no doubt less efficient than their bigger counterparts who spearheaded the Green Revolution in its initial stages. But it is also a fact that they are a far less demanding category. Their standards of living, aspirations and expectations being lower, they are willing to produce that extra kilo of grain for a lower profit margin than would be required to spur

better-off farmers on to further efforts.

This willingness on the part of the poorer farmers to perform at higher levels in return for lower rewards has had two significant consequences. On the one hand, it has permitted the country's economy to reap a bonus — in the sense that it has enabled the government to ensure a steadily increasing supply of foodgrains whilst pegging its procurement prices to levels which have lagged notoriously behind the rise in the cost of cultivation in the last 10 to 15 years.

At the same time, this very phenomenon has been playing havoc with the private economies, expectations and life-styles of the so-called richer farmers who, ironically, have turned out to be big losers as a result of the continuing success of the very same Green Revolution from which they were supposed to have derived more benefits than anyone else during its initial years. The declining profits from traditional cereal-based cropping patterns have reached the point at which the net cash incomes per acre of these farmers are now way behind the surrounding surge of inflation and rising incomes in almost every other walk of life.

The resultant erosion in their sense of well-being and self-assurance based on traditional status lies at the root of the myriad *kisan andolans* in various parts of the country over the last few years. Whether it is in the Jat strongholds of Haryana, west Uttar Pradesh and north Rajasthan or the sugarcane and cotton tracts of Maharashtra, the common factor in all these protest movements is that their backbone is provided not by the weaker sections of agricultural society but by precisely those sections which have traditionally been considered the dominant agricultural castes in their respective areas.

In this context, in the case of Punjab, among the causes which have contributed in no small way to the prevailing unrest, a special place on the list must be reserved for the declining incomes to be had from wheat and paddy. The cultivation of these two major crops has traditionally been monopolised by the state's predominantly Sikh Jat farmers who, quite naturally, have not been slow to take note of the sharp contrast between their now relatively stagnant circumstances in the countryside and the rising tide of prosperity in other occupations in the predominantly non-Sikh urban areas.

To sum up, the wheel of the Green Revolution has turned a full circle in the last 20 years. Two decades ago, left-wing economists of various hues writing in the prestigious *Economic and Political Weekly* would hold forth against the dangers supposedly underlying the new technology in agriculture. For some mysterious reason, they had never taken kindly to the high-yielding seed varieties. They were resolutely convinced that these seeds would only endlessly enrich already well-to-do farmers at the expense of the poor and thus drive the latter to unwholesome disaffection. But as matters stand, in any normal year, India is now in a position to export three to four million tonnes of grain that are surplus to its requirements, and the more visible discontent is not that of the rural poor but that of the so-called rural rich.

In any other country, corrective measures to deal with such emerging situations would almost certainly have been formulated several years ago. But in the case of India no such initiative appears to be in sight, perhaps because the historical memory of 2000 years of humiliating dependence on the vagaries of the monsoon seems to have had a crippling effect on the thought processes of policy-makers.

All over the world, the achievement of self-sufficiency in the production of foodgrains has invariably been followed by a drive towards the intensification of more remunerative activities such as dairying. And in this context, there is overwhelming evidence to establish that the most efficient way to produce abundant quantities of milk at the lowest possible cost is to maintain large numbers of animals drawn from breeds of proven milch ability on rations made up of vast amounts of fresh green fodder, as opposed to mixtures of enriched compound feed and dry matter.

The fact that there is now a surplus of four million tonnes of wheat implies that Indian farmers on nearly two million acres of irrigated land can safely be encouraged to divert their attention from the production of cereals to some other activity. Yet there has been no sign of a drive to seriously popularise and promote with suitable credit and other infrastructural facilities a comprehensive package of practices designed to encourage a holder of say, 10 acres of irrigated land to switch to the ownership of a small herd of stall-fed, cross-bred cows. This, in spite of the fact that research projects in various institutes over the last two decades have gathered ample evidence to show that, under Indian soil and climate conditions, Indian farmers can easily out-do their European counterparts in the production of fresh green matter all round the year, because they do not have to face the drawbacks of the severe European winter which often impedes any kind of vegetative growth during four to five months.

This is not all. Coordinated cropping practices that would permit farmers to provide their animals with balanced, low-cost diets along the lines described above can by themselves be of little use in the continuing absence of a high-yielding cow with a superior capacity for the profitable conversion of kilos of feed into litres of milk. And here, too, there is ample evidence to show that what has so far been done to meet the farmer's requirements in this regard is woefully short of the mark.

To begin with, the Indian cow is not an efficient producer of milk. Most Indian breeds have been selectively developed over the centuries to survive under difficult environmental conditions and to produce sturdy working bullocks. Attempts at getting these breeds to produce more milk are more often than not unrewarding. In nine cases out of ten, Indian cows generally respond to an improved diet with such a small increase in the output of milk that no dairyman feels encouraged

to undertake the additional effort and risk involved.

The panorama for the Indian buffalo is equally sombre. There is a strict limit to its genetic potential for increased production of milk. Its ability to perform well is tied to restricted geographical areas in the sub-continent. In addition, its mating habits — and consequently, its lactations — are notoriously unreliable. The high fat content of its output also implies that in order to increase its production of milk there has to be, at each stage, a corresponding increase in the protein concentrate content of its rations. In other words, every additional litre entails a high cost which, in turn, reduces the dairyman's profit margin, thereby virtually discouraging him from increasing his output.

It has been known for many years that the obvious answer to the problem is to intensify the pace at which this country's milch herd is being cross-bred with the much more efficient breeds of Europe and North America, some of which are quite capable of producing 17 to 20 times as much milk as the average cow in India.

A damning indictment of the inadequacy of the pace at which such cross-breeding has been promoted so far is provided by the exorbitant prices that farmers all over the country are beginning to pay for cross-bred cows which are in acute short supply in relation to the demand for them. Even more shocking is the fact that, during 1987, there were recorded instances when farmers in the Delhi and Punjab milk-shed areas were willing to pay higher prices for Holstein cows than were being paid for them by the infinitely richer farmers of western Europe.

Such instances are surely unmistakable signs that farmers are a step ahead of policy makers in grasping the message that it is only through these high-yielding breeds that they will be able to produce more milk for India's growing urban population in the 1990s, without pushing the cost of every additional litre to the point at which the common man can no longer afford to pay for it.

One can only suspect that the policy maker has been reluctant to permit any spectacular growth in the number of cross-bred animals because he has known all along that in order to obtain satisfactory results he would simultaneously have to arrange for a corresponding increase in feed and fodder resources — and this is a decision which he has so far been unwilling to face, on account of the entailing shift in irrigated acreage away from cereals to green fodder.

Such a decision, however, cannot be postponed indefinitely. The merits of any proposed 'technology mission for dairy development' must necessarily be judged in terms of its ability to address itself to this fundamental question.

Let there be no mistake that any attempt at persuading farmers to increase their production on the strength of purchased concentrates and dry compound feeds can, in the long run, only result in failure. No matter how efficient the farmer's new animals, a strategy based on purchased inputs cannot bring down his costs. And unless his costs are dramatically reduced he cannot obtain the high profit margins that are required to stimulate him to unleash the kind of revolutionary increase in milk production that is needed today to sustain dynamic rural growth, generate substantial new employment and ensure the badly needed supply of milk at an affordable price for this country's burgeoning urban population.

This is not to suggest that nothing should be done to improve the cooperative collection, storage, processing and delivery of milk; or to up-grade arrangements for animal health and care; or to castrate and scrub cattle; or to institutionalise the supply of molasses for emergency maintenance rations for cattle in drought affected areas; or, for that matter, to improve the quality of pasture on common lands. These are all unexceptionable measures. But they cannot make up for the failure to place Indian dairying on a sound land-based footing once and for all by promoting the progressive diversion of irrigated acreage to the production of green fodder.

Literacy drives

HARSH SETHI

ON October 2, 1978, the Janata Government launched with great fanfare the National Adult Education Programme (NAEP). After being reminded what a great curse adult illiteracy was, we were informed that as against the earlier allocation of a mere Rs. 9 crores per year on adult education, the NAEP budget for the plan period would be an impressive Rs. 200 crores, well over 10 per cent of the revised plan for education. In somewhat smug and satisfied tones, it was announced that past failures on this front notwithstanding, the NAEP would result in over 65 lakh persons being covered within the plan period.

Equally impressive was the line-up of experts. The writings of Ivan Illich and Paulo Freire abroad and those of Gandhi and Rabindranath Tagore were dredged up to buttress the philosophical and methodological claims of the programme. New schemes for the involvement of new actors were dreamt up. Plans were made for the involvement of all — from school and college students to voluntary agencies and trade unions — in this new and exciting societal adventure. Social science research institutes were to be involved in ongoing evaluation and corrective measures; new primers and modules were to be prepared — and this time on a decentralised basis, a different one for each eco-cultural zone. Educational activist groups such as Kishore Bharati in Madhya Pradesh, SWRC[1] and Seva Mandir[2] in Rajasthan, K.R. Educational Trust[3] in Bihar and dozens of others were drafted in on boards and committees and sent off on educational discovery tours to Vietnam, Guinea-Bissau, Cuba and China. For once the government seemed to have woken up to the importance of the programme, and a fresh initiative with new and creative actors seemed to be underway.

Just the other day, when our revered PM Rajiv Gandhi lit the

1. Social Work and Research Centre started off as an integrated rural development centre in village Tilonia (Ajmer district) in 1972. Of special interest is their night school programme for school dropouts where more 'schooled' children have taken over the responsibility of teaching their younger brethren. Its success lies in the fact that, even when the teachers need to be away, the school runs normally.

2. Seva Mandir was started by the late Mohan Singh Mehta, an eminent educationist. For over three decades, Seva Mandir has trained hundreds of young men and women in Udaipur district to get involved in developmental programmes, particularly for the tribal communities.

3. K.R. Educational Trust, Bettiah, Champaran, an informal Jesuit educational centre, has for the last two decades used Freirian methods to conscientise and organise the oppressed. A remarkable validation of its contribution comes through in the unstinted appreciation of their work, even by the Marxists, who normally look upon most Christian work with suspicion.

literacy lamp to launch the National Literacy Mission (NLM), the feeling was that one had seen all this before. When he claimed that, 'Development is not just about factories, dams and roads. Development is basically about the people,' the sense of *deja vu* was reinforced. After all, all that seems new is that we are ten years older (and hopefully wiser), that the range of technologies available to us represent a wider spectrum, and that the PM, the highest political authority in the land, has personally launched the programme. We must, after all, admit that Shri Morarji Desai did not deem it important enough to do that!

The conversion of illiteracy (the absence of the three R's) into an affliction is a relatively recent addition to the line-up of diseases. While all ills should not necessarily be traced to our colonial encounter, the importance of the written word increased as we entered the modern age. So for a country and its leadership which never tires of extolling the sheer magnificence of its past achievements, a 5000-year continuous cultural history, the remarkable synthesis and co-existence of hundreds of diverse cultures — the thought of entering the 21st century with a backlog of nearly 110 million illiterates in just the 15-35 age group must indeed be an anathema. And, of course, the skills of reading and writing are indeed critical in today's world, not merely as a means of entry into the world of universal knowledge, but as skills for survival.

Let us look at the issue of literacy a little more closely. There are, of course, those who argue that the 'pride of place' given to literacy within developmental thinking is fundamentally misplaced; that if nothing else it is not feasible to make an entire country of over 800 million people literate even in the next century. Some even go to the extent of arguing that, should such an eventuality come to pass, just the ecological implications of the paper requirements to satisfy reading and writing demands may well be disastrous. Others point out that Europe, a century back, went through similar debates when the proponents of mass literacy made claims such as: 'literacy will lead to an all-round cultural development of society', that there would be a 'reduction in social conflict' because people would now 'understand each other better', that a 'literate citizenry is both more responsive and responsible'. The claims can now be assessed for what they are worth. Thus today, when literacy drives involving massive expenditures and increased state involvement are justified on similar grounds, it may not be out of place to be a little sceptical.

For well over a hundred years now both governments (native, colonial, and of free India) and social and religious institutions have operated with literacy as one of their prime objectives. And while much of their activity was fairly pedantic, this period has also witnessed remarkable innovations in pedagogy, the content of teaching materials, in involving people through the use of non-conventional mediums like prayer meetings, *jathas*, *kathas*, puppetry, theatre and cinema.[4] Over the years, one can recall experiments that relied on the use of the dialogic approach to learning and related the content to the daily life, tribulations and struggles of ordinary people. For instance, Tagore's efforts in Shantiniketan and Sriniketan, David Hosburrough's work with children, the impact of the IPTA movement in the 40s and the 50s, the efforts by Kishore Bharti and later Eklavya to popularise and democratise science education, and the work of Sr. Gladys D'Souza in language teaching in Bombay slums – we can easily cite dozens of exciting, innovative attempts to transform the nature of our educational enterprise. This rich legacy notwithstanding, as we launch ourselves on this new NLM, we have a stock of over 100 million illiterates, concentrated heavily among the scheduled castes, tribes, and women, and in regions like Bihar, Rajasthan, and Andhra Pradesh.

One wonders why all our past efforts, official and non-official, have been unable to make the kind of dent we have wanted to make on the problem of illiteracy. Some studies stress poverty, some the lack of infrastructure, some the content of our programmes, while others the fact that we are essentially an oral culture. As far as the official education efforts are concerned, the most trenchant critiques are available in the first few chapters of the document, *The New Educational Policy*. Both in the policy and in the NLM documents, we have been presented with a long list of reasons why earlier programmes, including the NAEP, could not become a relative success.

The review of the ongoing programmes, after a brief listing of 5 positive items, has a 9-item long list of problems. These range from poor training of functionaries, lack of credibility and misreporting in the monitoring system, defunct learning environment in the adult education centres, lack of support from mass media, lack of cooperation, if not discouragement, with voluntary agencies by state governments, high drop-out rates among learners, absence of post-literacy and continuing education arrangements, and lack of political and administrative support by state governments and panchayati-raj institutions. One may legitimately be permitted to wonder as to what went right.

If so many things have indeed gone wrong with past efforts, and the current overall social environment hardly appears more conducive than that of a decade back, what is it that enthuses the NLM structure to believe that this time around the experience will be different? While one does not want to sound a defeatist cynic, the difference, after all, cannot merely be that it was the PM who lit the literacy lamp, and that the programme has been accorded the status of a national mission with a budget of Rs. 550 crores to be spent before 1990.

What have been identified in the mission document as the key ele-

4. Reference is being made here to groups like Allarippu (Delhi); Shankar Singh's puppetry groups attached to SWRC, Tilonia; Aloke Roy's work in the use of mime; the Kerala Shastra Sahitya Parishad's use of *jathas*; Samudaya, which in the decade of the 70s used theatre for popular education; the theatre unit of the Chattisgarh Mazdoor Shramik Sangha, etc.

ments to ensure the success of the NLM are only abstract slogans such as an increase in national commitment, creation of an environment conducive to learning, motivation of learners and teachers, mass mobilisation and people's involvement, and an efficient management and monitoring system. Mention is also made of new techno-pedagogic inputs. And all this is to be achieved through increasing participation, particularly of youth, generating a conducive environment through a media blitz, training, use of forms like *jathas*, a sizeable step-up in the involvement of voluntary agencies, launching of a mass movement, universalising the outreach, and undertaking technology demonstrations in 40 selected districts.

As one ploughs through the dozen-odd documents so far produced by the NLM authority in English and Hindi, other than the endless list of fine-sounding exhortations, impressive graphs and tables of targets to be fulfilled, what strikes one as somewhat different is the emphasis on the use of new technology (this, incidentally, is well in keeping with the times) relating to buildings, blackboards, pieces of chalk, booklets, the use of audio-visuals (read television) and computers, and the setting up of Jana Shiksha Nilayams (JSN). While the former is expected to be a great help in improving the quality of the learning, the latter is expected to respond to the needs of post-literacy follow-up and continuing education.

It cannot be denied that improvement in the learning environment through the provision of more aesthetic, airy and better lit rooms, better blackboards and chalk, better printed booklets, flash cards and charts does make a difference. And the fact that the government can indeed produce more impressive looking booklets is proved by the 'quality' of the handout material. Alas! What does not seem to have changed much is the content. The three booklets on the stories of Ramu the poor peasant, Ganapat the landless labourer, and the unnamed woman — who eke out a miserable living till some do-gooder enters their lives, helps them to acquire literacy, and *voila*, their lives are transformed — do not seem any more convincing than the average Doordarshan programme.

Somewhat more depressing are the booklets *Mass Profiles In Literacy*, *Crusade Against Illiteracy* and *Programme on Functional Literacy*. The photographs of stiff looking good samaritans — college students in Delhi, NSS and NYK (Nehru Yuvak Kendra) volunteers — and stories of how they managed to teach 'poor unfortunates' to read and write, under the 'each one teach one programme' are hardly likely to motivate the average reader. If anything, they remind one of the kind of essays school children write when asked about their good deed of the summer holidays! As for the model kits which are to be provided to the various adult education centres, if the one prepared by the Directorate of Adult Education, Delhi, is any indication, imagination does seem to be a commodity in short supply.

The programme of setting up one JSN for a cluster of 4-5 villages (population around 5,000) undoubtedly represents a great improvement over the NAEP. But to believe that each JSN (incidentally, a permanent structure) will have a library, a reading room with journals (not magazines), a communication centre with a community radio and tape-recorder, a colour TV, an information window — a location where evening classes, a *characha* mandal, training programmes, sports and adventurous activities, and recreational and cultural activities will be concentrated—does seem to be a bit far-fetched. Such a complex of facilities would put most of our middle-schools, never mind the average primary schools, to shame. It is not as if one grudges, or is against better facilities being provided to villages. But the promise — no more than an alluring pipe-dream when one considers that schools, even in the heart of the capital, may well be run in tents, cattle sheds, or under a tree — cannot be described as anything but a cruel joke.

Somewhat more disturbing is the fact that the loving care evident in the printing of the various booklets has not been extended to the adult education instructor (AEI). Of course, we are informed that the AEI will undergo better and more intensive training, and consequently be expected to perform his/her job better. But no effort has been made to increase the 'honorarium' of this all-important person. This still remains in the Rs. 50-200 p.m. range. One presumes that a higher expenditure on this lowest, though key, functionary will push the overall budget beyond acceptable limits! At least this is what is the financial advisor always hides behind.

Similarly, no effort has been made to insulate the 'teacher' from the varying pressures of the district administration. This all-purpose entity is expected to be of help in every conceivable government programme, including those related to family planning. One may be permitted to add that, even now, as the various educational policy documents are going through revision and modification, the activity mix of the AEI has not been settled. Particularly with respect to involving the AEI in family planning/welfare programmes, many have argued and quite correctly, that since the family planning worker is viewed with a lot of suspicion, the AEI teacher (particularly a woman) can hardly be expected to win the trust of and generate confidence amongst the villagers. Nevertheless, senior officials have so far fought shy of taking a frontal position on this question. So they either end up filling fictitious forms indicating target achievement, or become petty-functionaries who, with the monopoly of information about government schemes, extract 'rent' from the rest of the village community.

Finally, it is difficult to understand why each programme is described in terms which indicate its absolute centrality, and how all 'resources' would be pooled to make the concerned programme a success. One would really like to know how this can be done for all programmes simultaneously.

As one goes through the details of the different sub-programmes which go to make up the NLM, what comes through very strongly is the lack of humility, a lack of introspection about past efforts, and a simple-

minded confidence about the power of technology, authority and money. A country which can continuously push back its constitutional guarantee of universalisation of primary education (such that this laudable objective is hardly mentioned, even ritualistically, these days) and has been unable to reduce the extremely high drop-out rates at different levels of the formal educational structure, has little business to plough scarce educational resources in the name of a new societal mission on literacy.

To repeat, none of this is to argue that programmes for literacy are undesirable, or that easier or more generous support to a large variety of non-official agencies will all be wasted. Hardly. The recently concluded Vigyan Jatha planned by the Kerala Shastra Sahitya Parishad which involved hundreds of groups across the country, was undoubtedly an exciting venture. And it did receive generous support from the government. The fact that there has been some criticism about the *Jatha* having focused all its attention on the wrong-doings of western states, while remaining relatively silent on both our government and the socialist states, does not detract from the commendable effort in involving dozens of different science and popular education groups from across the country. Last year, in a month-long programme, *jathas* started off from all four corners of the country to converge in Bhopal on December 3, the day of the gas-leak tragedy.

In all large efforts, we have a mix of success and failure, discovery and involvement of highly creative people, and charlatans and racketeers getting new opportunities to rake off public money. What, however, is often forgotten in the excitement of ensuring participation in a mission, is that the focus and the public eye are directed towards the flashier parts of the programme — the new programmes on TV, new songs written up to propagate the virtues of literacy, computer-based monitoring systems, fancy demonstration JSNs — while the hard business of adult education—the involvement of motivated 'teachers' who will work over sustained periods to develop rapport with a community, battle the lower bureaucracy to extract resources for their people, etc. — tends to get passed over. Just talk to those who have been at this 'business' for a long time. They know that there are no easy and dramatic successes, that what it takes is hard work and persistence, that colour TVs and computers do not alter the grim realities on the ground. It is then that impressive tables and graphs showing exponentially rising curves of literacy tend to generate cynicism and bitterness.

Neither do suggestions such as introducing a 100-marks paper on adult education making it compulsory for each student to 'convert' ten illiterates into literates before being awarded a first degree, or shutting down all high schools, colleges and universities for six months so that students and teachers can fan out into the countryside on their secular proselytising mission (both suggestions, incidentally, are part of the agenda papers for the recently concluded meeting of the NLM executive committee) show much serious thinking.

To argue, as many in that meeting did, that such was the experience of Cuba, Nicaragua, China, the USSR and Burma, is to obliterate not only all the socio-political and cultural differences between these very different societies and ours, but also to have little regard for issues such as scale, the fact that each of these countries were in a high state of 'post-revolutionary' mobilisation, that their political leaderships enjoyed higher credibility, etc. Are we to seriously believe that the middle and higher educational structure, normally dismissed even in official documents as elitist and serving an essential purpose of keeping volatile youth confined, will now act out the role of enthusiastic missionaries? If anything, discussions on such steps like shutting down colleges and schools, far from enthusing, only generate a fear psychosis. Just imagine the damage that lakhs of ill-trained and insensitive college students in search of illiterates are likely to inflict on the unwary populace.

It is indeed instructive that both in the 'impressive' headquarters of the NTMs, and in the different states where the programmes actually have to be carried out, of all the NTMs, it is the mission on literacy that generates the least enthusiasm. Probably even the suave and persuasive Mr. Pitroda knows that delivering speeches about the virtues of literacy, or on the importance of inculcating values of secularism and national integration is not the same as enthusing and motivating lakhs of cadres necessary for a societal mission. It is thus that 'praudh shiksha' (adult education) faces the danger of being converted into 'fraud shiksha'.

One could, of course, argue, and with equal legitimacy, that programmes should not and cannot be judged merely by what is contained in the documents produced by the programme authorities — that each programme encodes a high degree of free-play which can be made use of by interested participants. In fact, the more experienced policy-makers will argue that policy documents have necessarily to be woolly and vague to not only satisfy the politicians but to permit those involved the freedom to mould the programme to suit the local conditions. Thus, if the model kit produced by the Department of Adult Education in Delhi is a washout, the one being used in Rajasthan has been enthusiastically received by the lay teacher and learner. Similarly the few JSNs that one got a chance to visit left a very pleasant feeling. Lots of children and women sitting around reading magazines, animated discussions taking place on issues of local import — all in an austere and aesthetic one-room building. It is not surprising that in many district and block level meetings the JSN scheme has been welcomed.

A second issue relates to the vantage point from which one looks at a programme. As an example, the much 'criticised' Novodaya Vidyalaya Scheme, a part of the New Educational Policy, has undoubtedly resulted in a major improvement of facilities at the district levels. It also should be ungrudgingly admitted that a vast number of those who have managed entry into these schools can by no means be described as 'elite'. How, then, should we react to this scheme? At one level, better facilities

have been extended into newer areas with in-built access for people who would otherwise be left to suffer the horrors that the vast majority of our schools perpetrate on children. On the other, we have a major infusion of resources, talent and hope being pumped into a new structure, leaving the rest of the educational paraphernalia in its abysmal state. Are we to see this primarily or only as a sop to the increasingly powerful rural and semi-urban elite, or do we see it also as an improvement, albeit a marginal one?

One does realise that every programme elicits very different reactions from the policy planners and administrators, the participants and recipients, and the social critic. Often the gap between their perceptions is an unbridgeable one. Coming back to the NLM, all that one can say is that even after recognising that in this vast venture many experiments will indeed unfold, particularly where local talent, commitment and enthusiasm is high, these scattered worthwhile efforts cannot be garnered together into a defence of what is otherwise a centralised, ill-thought-out, and gimmicky programme. Neither past experience nor the broad parameters of the NLM enthuse much hope.

While criticism, even if dismissive, has its place in the discourse on social policy, is there really a different kind of programme which is possible? One realises that the moment a feasibility rider is added on to any programme, the broad socio-political parameters remaining the same, a genuinely alternative programme is not possible. That is why there is little difference between the NAEP proposed by the Janata Government and the NLM offered today. Even the few efforts made by the Left Front Government in West Bengal do not look very different.

The real difficulty faced by educational policy planners is that while there are scores of innovative micro experiments which have succeeded in their local environments, we have very little which has successfully gone to scale. Within the educational stream, one of the few efforts that handled a scaling up with relative success is the science teaching programme initiated by Kishore Bharati (KB) and the Friends Rural Centre (FRC) in Hoshangabad district of Madhya Pradesh.[5] KB and FRC worked in 16 middle schools for over 5 years. Only after gathering the necessary experience, training hundreds of teachers, evolving new teaching materials, etc, was a slow expansion, through setting up a new institute, Eklavya, in collaboration with the MP Government, tried.

The key elements in this step-up process were autonomy, rigorous training, positive reinforcements, and deliberately keeping the speed of expansion low. What one sees as positive here is the ability to resist rapidly incorporating what are seen as 'replicable elements' in some large-scale programme.

The state is at best capable of handling only the formal educational structure. If it does what it is supposed to at the school level — ensuring decent running primary and middle schools, the addition to a future pool of adult illiterates may not be so glaring. The other work ought to be left to groups and agencies who are much better equipped to handle such tasks, are locally rooted and environmentally sensitive, have demonstrated both a commitment and a willingness to innovate and are not looking for quick and dramatic results. Expecting miracles at the literacy front without tackling other and equally pressing social issues is a sure recipe for disaster. The NLM authorities, even if they cannot come up with better positives, can at least seriously consider a policy of greater restraint. But that, in an environment that demands high media presence, may indeed be difficult.

5. The Friends Rural Centre, Hoshangabad, is a century-old quaker centre and the T.B. Sanitorium which, in the early seventies, got involved with the science teaching programme. Eklavya was set up in the early eighties as a state government institute — primarily to carry on and expand the science education work initiated by KB and FRC. Recently, they have also moved into experimenting with social science teaching at the school level. Ekalavya brings out two fascinating magazines for children, *Chamak* and *Hoshangabad Vigyan*, which reach thuosands of school-going children in Madhya Pradesh.

Local technologies

NIRMAL SENGUPTA

THE one programme that undoubtedly qualifies for being a mission is the drinking water programme. It is a shame that after forty years of independence there is no source of drinking water in over a lakh of villages. To make matters worse, there is no public information about the location of these villages. In this gloomy context, the programme doubly qualifies for being a mission and indeed, without missionary zeal, such an uphill task cannot be achieved within the short time promised.

With due deference to those who have accepted this challenge, one may point out several limitations of the programme. The so-called Technology Mission has been described as dealing with those problem areas where the technology exists and where, through proper management, it can be extended and appli-

ed. While such a notion is true for other missions, it is not so for water. Not only is the availability of sources a recognised problem, the question of technology also needs to be examined. I shall examine the possibility of considering alternate technologies.

To cope with the water scarcity, during the 1986 drought in Jhabua district, several rain-fed tanks were constructed with some success. In different parts of India in different periods many rudimentary methods like tank construction have been used for drought relief. The age-old mission, the search for water, has its effective age-old techniques. The question is whether the hi-tech mission would be able to reorient itself to adopt such 'unimpressive' techniques.

By now it is well known that canals and tubewells are largely confined to a small part of the country. The Indo-Gangetic plain is the most suitable region accounting for about 40 per cent of these two sophisticated techniques. The exact data pertaining to drinking water sources is not available. But on the whole, there is little difficulty in obtaining suitable drinking water in this area, rich in water resources. What happens to the rest of the country which accounts for practically 80 per cent of the geographical area? There, the need is for more imaginative techniques. And though it may sound unfair, the fact is that water-resources engineering has rarely been able to go beyond its own conventions.

For example, arid and semi-arid peninsular India is not rich in ground water. The marked slope of the country effects quick drainage of natural precipitation. These are areas with chronic shortage of drinking water. The old technique here was to store the run-off in smaller so-called 'tanks' which served for both irrigation and drinking purposes. It is noteworthy that 40 out of 55 districts selected by the Water Mission are located in such 'tank' country. Since the Technology Mission has not as yet announced its detailed strategy, one does not know how it is trying to cope with the resource problem in these areas. But fragmentary reports that have come in do not depict a very hopeful picture.

In other parts of India, too, there are traditional techniques for procuring water, like the *kuh's* in the Himalayas or the deep wells, including step-wells, in the drier west. The *kuhls*, again, represent a technique of water appropriation in an area not suitable for standard methods of modern engineering.

Technologies like that of the tanks and *kuhls*, and their regional modifications like the *khadins* of Rajasthan and the *phods* of the Western Ghats, are specific to India. While such technologies are often viewed as a matter of pride, they are not considered to be of any practical value. The very fact that they are specific to India virtually excludes them from the international literature of irrigation engineering. Very few experts know what *kuhls* are, or that the 'tanks' are not really tanks.

The Indian technique of storing water in elevated embankments is very different from ponds or lakes. The Indian nomenclature is different. But the accepted English terminology obviates such distinctions and, in consequence, no development has occurred in the Indian variants of 'tank' technology. This ignorance found strong support in the drive for scientific progress and modernisation. It is in India alone that the tanks, constructed with traditional techniques, can be so curtly rejected. Only here can such a great divide exist between the traditional and the modern, thanks to our colonial heritage. One hopes that the Technology Mission does not serve to further strengthen such snobbery.

All these traditional techniques are viable over specific terrain conditions not conducive to the standard engineering techniques. But that does not imply that they are perfect. The rudimentary civil engineering knowledge and limited social hygeinic considerations with which they were made and maintained in the past demand a great deal of improvement. And this is where modern scientific progress could contribute systematically as against the disjointed progress of the past.

Japan, with no colonial domination, could do just that. The Japanese did not reject their traditional techniques nor did they retain them as museum pieces; instead, they worked to systematically improve them. The colonial history of India led to a priori conclusions regarding the inefficiency of indigenous techniques. This trend has continued even after independence. And today, particularly after the sixties, about 40,000 hectares of indigenously irrigated areas are decreasing every year without any compensating advance of canal or ground water exploitation. In this context, what is needed is not an INTACH variety of heritage preservation but a C-Dot type of patriotism that also brings progress.

There is immense scope for improvement. Even a city as big as Madras gets its drinking water supply from tanks. The quality of water has been improved by suitable treatments. Why can the same approach not be applied elsewhere? Besides, the lakh-strong network of tanks in the arid and semi-arid regions of the country retain nearly 10 per cent of the local run-offs for a few weeks. Their contribution in recharging aquifers to provide ground water sources for human consumption, as well as in the direct support given to livestock in drinking water supply, cannot be underplayed by any sensible scientist. The rudimentary expertise with which the *kuhls* were made in difficult terrains can be systematically improved. They provide very good quality drinking water. In the west, the unhygeinic wells can be treated properly.

But it is more important to understand the traditional distribution system that restricted overexploitation. Besides, the whole network of flows and stores demands information for efficient running. Modern information technology has been of great help in parts of Europe. There is an even greater scope for it in India. Satellite inquiry and geophysical surveys can be of use in finding suitable locations and modern civil engineering can alter the terrain to help extension on an unprecedented scale.

The determination with which the Technology Mission has taken up the task makes one confident that this technological possibility will not be overlooked by them. But then comes the big question — how far will they be able to exploit the potential? The existing water-control engineering rarely deals with these techniques. Every extension has been piecemeal and there is absolutely no knowledge about location criteria, safety methods or system characteristics. Even if a satellite inquiry is commissioned, one does not know what to look for. Let alone other things, the fact that a large variety of technologies have been included under one classificatory head 'tank' is also not widely known. With such complete bankruptcy of expertise, how can one dare to expect anything substantial?

The only hopeful sign is that Mr. Pitroda and his associates, while outlining their approach, talked of modest but model achievements. If they are really trying for this — one does not know since the details have not been made available — they may make a pioneering contribution to this long overdue task. Indeed, the problem with drinking water is not only one of ensuring its supply but also of establishing regular and self-sustaining mechanisms.

There are indications that new areas are becoming problematic as a result of deforestation and diversion of water courses while arranging for immediate relief to drought affected villages. The mission may also make some modest attempt to reorient the basic science. The modern water-control methods, learnt by the professional water-technologists, rarely mention localised techniques. The Technology Mission professes to be nationalistic in orientation. If they do not restrict themselves to import substitution, neglected indigenous technologies may receive some attention.

The last problem is that of management. While the mission has been emphatic about the necessity of good management in all its programmes, there has been little elaboration on that. Management of common resources like drinking water cannot be modelled in the manner of a steel industry or a telecom establishment. Are the mission personnel aware of this? One does not know. The highly decentralised local water systems do not permit centralised management. This is another reason why they continue to be neglected in India, a country where water control is officially considered synonymous with engineering.

In many other countries, the irrigation departments include and, indeed, invite the participation of other disciplines, including legal expertise and community organisers, reflecting the actual operations of water control. Our experts generally tend to distrust people's participation, an attitude that has only recently started changing. But as yet little is known about how to encourage and perpetuate peoples' participation or the proper ways of approaching villages divided by castes, classes and feuds.

There is, however, the hopeful sign that the Technology Mission will not take up a purely technocratic approach, but make an attempt to involve people from all walks of life. But this is merely one step forward. The policies that could have helped develop a decentralised management procedure capable of achieving the necessary goal in maintenance and allocation has not been articulated. Indeed, there is very little to suggest that the Technology Mission understands the necessity of a management approach distinct from that of an industry.

There are several other problems. For example, even if the source is obtained, the problem of achieving the 'per capita, per day' distribution remains. Then there is the problem of transferring the resources from the supplier to the users. These are not problems of management but are largely of a politico-economic nature. One can legitimately wonder in what way the mission envisages its approach to management — through the consideration of political economic reality or by ignoring it, as has been the case in conventional management?

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Karnataka — Celestial in thought, wondrous in creation

Born in the innermost recesses of the soul, man's creative spirit is boundless. And expresses itself in a thousand ways, Painting, sculpture, drawing. Poetry and prose. Dance, drama and music.

The magic of melody: — In the realm of Indian classical music Karnataka's role is both unique and significant. Carnatic music draws its very name from it. And some of the greatest living exponents of the Hindustani musical genre hail from this state.

In ancient times, Karnataka had produced highly advanced works on music, the detail and scope of which are unmatched to this day. Notable among them are Bharata's natyasastra, Matanga's brihaddessi, Shamgadeva's sangita ratnakara, Vidyaranya's sangitasara and Ramamatya's swaramelakalanidhi. Composers too were equally prolific, the most famous being Purandaradasa, whose pillari geetas are till today the foundation lessons for any student of Carnatic music.

With this background, it is not surprising that Karnataka has produced some top musicians in Carnatic music — Veena Sheshanna, Bakshi Subbanna, Mysore Vasudevacharya, Muthiah, Bhagavathar, Bidaram Krishanappa, Devendrappa and T. Chowdiah to name only a few.

In Hindustani music, the songs of Amir Khusro were well known in Karnataka as far back as the 14th century. Also highly renowned was musician-composer Sultan Ibrahim Adilshah II of Bijapur whose Kitaab-e-Nauras is full of compositions in the Hindustani dhrupad style. Some of the most famous figures on the national arena of contemporary Hindustani music too are from Karnataka—Bhimsen Joshi, Gangubai Hangal, Dr. Mallikarjun Mansur, Kumar Gandharva, Devendra Murdeshwar & Basavaraj Rajaguru.

This prolific musical activity is no accident. Karnataka's unique geographical position makes it an ideal meeting ground for all kinds of styles, concepts and ideas. Nurtured by rulers whose patronage of the arts is legendary.

The power of the pen : Karnataka's literary history is more than a thousand years old. And the works of its early writers display remarkable erudition and skill. The Jaina period saw great epics like Pampa's *Bharatha* and Ranna's *Gadayuddha*. The Veerashaiva movement followed, the moving spirit of which was Basaweshwara — religious teacher and social reformer. He enriched Kannada literature with a new style of poetic prose called vachanas.

Modern Kannada literature has been upholding this immensely rich tradition. Four of the recipients of the prestigious Jnana Peeth award, out of the 14 awarded so far, are from this state — K.V. Puttappa (Kuvempu), D.R. Bendre, Shivaram Karanth and Masti Venkatesa Iyengar.

It can be said without exaggeration that there is no field of literature that Kannadiga writers have not explored and excelled in — be it prose, poetry, lyrics or drama.

The drama of life: Karnataka's folk theatre has an ancient and rich tradition — the two principal forms being yakshagana and the puppet theatre. Yakshagana is a vibrant, colourful spectacle of elaborate costumes, melodious music and vigorous dancing. Karnataka is also famous for its harikatha and gamaka.

Music, poetry, dance and drama are the sparkling facets of the diamond that is Karnataka. Come, see and experience it for yourself.

Karnataka Information

Symbolic politics

SHIV VISVANATHAN

THE Technology Missions of Sam Pitroda have triggered off something deep in the body politic. At a time of institutional fatigue — scientific, technological and political — the Technology Missions have become a statement of hope. But history has shown the underlying irony of many such efforts. Many of these technological programmes, using the major buzz words of our time from science to progress, have begun with the best of intentions and ended in the destruction of our civil rights.

The project on big dams has resulted in the creation of over a million refugees. The nuclear energy complex uses seasonal workers to repair dangerous leaks and abandons them. Intellectuals like Dhiren Sharma are regarded as being anti-national for criticising India's nuclear policy and harassed. The havoc caused by 'progressive' family and urban planning programmes is well known. We had a forest bill, another example of progressive legislation that threatened to destroy the commons, the life support systems of thousands of tribes and peasants.

The question we must ask is, how can one prevent the Technology Missions of Pitroda from going the way of the exercises of Jagmohan, Kurien and Raja Ramanna? One believes this can be done through what Han Jonas has called the 'heuristics of fear'; by creating a dialogic scenario of fear and doubt to counterpoise the managerial optimism of the Technology Missions.

One believes that there is more to these missions than merely technology and that there will be more than just these five missions. Pitroda himself has confessed to a need for a Technology Mission on family planning. Newspapers have already reported plans for missions on housing and dairy development. Voluntary agencies must confront the Technology Missions immediately, for the ones that follow might be more lethal.

There are two ways of confronting the Technology Missions. The first is to examine them empirically, evaluating the organisational, economic, ecological and political viability of each mission. The essays in this issue do just that with a great deal of competence. But my focus is not on the missions *per se*. It is not the missions that I want to confront but the missionary. I want to look at Sam Pitroda and explain why I am afraid of him and his missions. But the Pitroda that I went to confront is not the flesh and blood man: I admit to his commitment, his idealism, his verve and his competence. It is Pitroda the media manipulator and media-lovely who frightens me. It is Pitroda the media archetype that I want to confront through an essay

on the symbolic politics of the present-day regime.

Every regime has a notion of unity, a set of official slogans that captures its aspirations. With Jawaharlal Nehru one thought of *Panchshila* (five principles of peaceful coexistence); with Indira Gandhi, the *Garibi Hatao* (remove poverty) slogan; with Rajiv Gandhi, one thinks of the summons into the India of the 21st century. All these slogans emphasise the aspirations of the nation-state, but there is something different about the last one. While the first two forge some combination of a civilisational past and an industrial present, the third projects this unity into the future. The future appears like a foreign country where we will do things differently.

This is a dynamic concept and needs three archetypal figures as media myths to anchor its ideological and technocratic unity. The first element of the triptych is 'Mr. Clean', Rajiv Gandhi himself. But there is a different aura surrounding the other two figures. The first figure, that of Amitabh Bachchan, caters to populist concepts and popular notions in a spectacular way. He is, as the psychologist Ashis Nandy has repeatedly emphasised, the first great urban hero. The second archetype, slightly more exclusive, is a technocratic and managerial figure and this cooler image is that of the technocrat as hero, Sam Pitroda. I want to examine the symbolic politics of these two figures and show that they help articulate the greatest soap opera of our time: the idea of development under the aegis of a nation-state.

Let me confess that academics like me, even if we do not see all his movies, take Amitabh seriously. Beginning with *Zanjeer* and going on to *Deewar*, *Sholay* and *Coolie*, he has become someone radical and unique in the mass imagination. As I mentioned, he is an urban hero. He is generally poor, maybe middle class, but with few roots in the rural frame. He provides a sense of the mobility of the system and there is a neutrality to the occupations he portrays. He is generally not Brahmin and bureaucratic but coolie, smuggler, worker, tongawala, common man, con-man. The southern Amitabh, Rajnikant, put the point lucidly in an interview. When the former bus conductor was once asked, 'If you were not an actor what would you have become?', pat came the answer: a bootlegger or a smuggler. Thus, all occupations seem ethically equal.

While this archetypal urban hero might lack a caste geneology, he does possess an innate dignity, which surfaces as a kind of physical machismo. There are obstacles to his career imposed by those in power and these are met by an orgy of violence. The painter M.F. Husain has called Amitabh the epitome of urban violence.

There are two additional points that can be garnered from the genre of Bachchan films. Firstly, there are always good people present in the system. There is always the committed cop, the honest clerk, the good father or the dedicated teacher in this otherwise corrupt system. Yet it is a goodness with limits. Implied within the script is a notion that conventional goodness or competence is not radically effective; it cannot wipe out corruption. It lacks the epic power of violent intervention to break the system.

Secondly, the urban hero, whatever his other vices, is intensely nationalistic. He wears his patriotism like a badge. And who is the villain, the most corrupt figure in the system? It is that most antinational of figures, the smuggler. The smuggler, usually called Robert (remember the actor Ajit intonating it?) or John, is an obstacle to nationalist dreams and visions. As a symbol, he represents the defeat of our *swadeshi* system, the eventual defeat of our import substitution model of industrialisation, our inability to produce anything from a decent watch to a tape-recorder. The machismo, the searing violence of Amitabh is inadequate to stop this corrupt system. He might eliminate a corrupt individual or a gang, but the system still remains. To counter the 'Johns' and 'Roberts' of the system and to complement the physical machismo with technological machismo comes Sam, Sam Pitroda.

Within a narrower framework, Pitroda represents an equally radical break within the technological imagination. *Swaraj* has been an integral part of the nationalist imagination articulated in its latest form in the slogan, 'be Indian, buy Indian'. Our nationalist movement has been obsessed with industrial competence and our *swadeshi* tracts have desperately sought its secrets. During the *Swadeshi* movement, whether you made a pot or a pan or a *chappal*, they were all celebrated like great acts of history. Most of these efforts were failures — witness the records of the Industrial Commission Report — and many were subject to con-men who took your money and disappeared. Our economic historians don't read these sections, but that is another point. Pitroda at last offers the promise of such technological competence.

Pitroda, like Amitabh, embodies the flexibility and mobility of the system. Son of a carpenter, he is now a millionaire. But his is not the genteel mobility of the older types of scientists. It is not the slow, ladder-like bureaucratic climbing of the Atma Rams and Ghoshs of the older system. It is a spectacular leap-frogging of a self-confessed entrepreneur, committed to Schumpetarian breakthroughs into the system. He is that rarest of Indian breeds, the scientist as entrepreneur. One must recognise this as something new and radical, which has not emerged since the days P.C. Ray established the Bengal Chemical and Pharmaceutical Works during the *Swadeshi* period.

Pitroda marks a discontinuity in the scientific-technological system in several other ways. In the earlier mythology of science, the scientist was a paper-producing creature. An FRS or an occasional Nobel prize *a la* Raman was the eventual goal of the system. The ordinary scientist was scared witless by pilot plant and production problems. A Pitroda is not interested in papers. He wears his patents like epaulettes.

Secondly, there is little or no concern with the metaphysics or philosophy of science in the Pitroda system, and none of the entanglement in the scientific temper debate that

a Pushp Bhargav or a Ramaseshan would indulge in. Pitroda is too shrewd (or indifferent) to get bogged down in the kind of scientific temper debate into which Ashis Nandy trapped a whole generation of scientists.

The Pitroda script is like that of Amitabh. There have been good scientists in the system. But their goodness and competence is invertebrate. The Yashpals and Menons create files. Pitroda threatens to make history.

Like Amitabh, he is a nationalist. He is playing out the American dream in India as a super-urban American who carries his new Indian passport like a flag. There is a technological machismo here and none of the namby-pamby debates on pilot plants or the dithering caution of the CSIR. Pitroda has claimed that his Technology Missions will expose the CSIR. The old left radicals of the system are no match for him. He can also trump an Ashok Parthasarthy by claiming to be both a better nationalist and a better scientist.

Like Amitabh, Pitroda is a man in a hurry. He is the scientist's Amitabh and no scientist in the post-nationalist period has so captured the media imagination. Pitroda's life, his work in office, even his office secretary, gets the kind of media space Krishnan and Bhatnagar received in their obituaries. He marks the end of the pure scientist as hero model. Years ago, a foreign scientist asked the scientists of NPL to name any one of their products that was being sold in the streets of Chandni Chowk. He was met with an embarrassed silence. Pitroda would have chased him from the hall.

Also, there is none of the gigantism of structures one associates with the Bhatnagars and the Swaminathans. Pitroda floats freely above these with his assault squad of professionals. And finally, like in the Amitabh scripts, there is a compression of time. What took Indian scientists – technologists years to achieve, now has the promise of quick delivery. It is like the change-over from a five-day to a one-day match. One wonders how many scientists will survive the change. But this capturing of the imagination creates problems, inaugurates possibilities of violence as radical as that of Amitabh Bachchan.

There is first the conflation of technological and political models. Politics is felt, by both, to be a slow, decrepit and convoluted process. In his films, Amitabh short-circuits the process through violence as in *Inquilab*. Pitroda does it through a substitution of politics by techno-managerial models. Unfortunately, he does not examine the oppressive geneology of management from Winslow Taylor's scientific management to present-day cybernetic theory.

In Pitroda's schema, a community is substituted by the formal system of an innovation chain, composed of the three stages of invention, innovation and diffusion. The invention stage deals with the conceptualisation of a scientific idea into a technological product, innovation with the commercial production and diffusion with the wider societal dissemination of the product. Society becomes for him a transfer of technology model, with the emphasis on innovation and diffusion. The basic policy lies in the diffusion of the goods of society and this diffusion is from centre to periphery.

In this model of technocracy, consumerism is conflated with participation. The body politic consumes but does not question. The linear clarity of the innovation chain is a managerial one. What is not questioned is the message or package, that is, the domain of invention. The package to be consumed and the knowledge systems that produce it are accepted *in toto*. There is no genuine theory of participation. The idea of people's participation arises only when they have to serve as extension counters of a top-down idea.

Secondly, Pitroda's TOT model moves across space which is empty. It is irritated by the density of place, by the past, by memory and tradition. In this model, people's view of knowledge, their conceptions of water or medicine appears as noise. The TOT model in this sense can become not only anti-democratic but anti-ecological. One can understand this best by looking at the notion of the other in the official system. It is mediated, I believe, by the idea of the India festival. Let us locate Pitroda in contiguity with Amitabh and Rajiv Gandhi.

When one looks at Amitabh's statements, one notices that he was promising schools, water, health and communication to Allahabad. Pitroda is saying that what Amitji promised for Allahabad, he can deliver for the whole of India through the Technology Missions. Between the two, they perform an inversion we must understand.

Through Amitabh, the semi-fascist state feels that it is linked to the underside of India and the Indian imagination. The Indian state feels that through Amitabh it is communicating with the common man, the coolie, the tongawala, the con-man, the smuggler, all the people in that micro-India, the slums of Khetwadi, that fuel the imagination of Manmohan Desai.

The links that Amitabh provides to the Indian masses are further expanded in the official idea of the India festival. There is the other underside of the Indian imagination — the craftsman as the sculptor, the painter and the weaver, and the folk artist as musician, dancer and performer. These systems are brought into display but only as 'exhibits', not for real use in the bazaars but as political acts of conspicuous consumption. *Visvakarma* is not resident in these craftsmen. The idea of the craftsman as hero has been appropriated by Satyen Pitroda who has replaced, as he himself put it, the *Charkha* with the electronic Chip. He thinks that they are merely two objects. I wish to stress that they are two separate semiotic systems and what I am contending today is that in pluralistic India, the Charkha and the Chip must be dialogic. Pitroda, I feel, cannot avoid such a quarrel nor can he be allowed to set the terms of such discourse.

The myth of Pitroda cannot be defeated empirically. Pitroda's Tech-

nology Missions have to be fought with counter-myths. The media myth of Sam Pitroda and his Technology Missions must confront the world of Sunderlal Bahuguna, Chandi Prasad Bhatt and that of the Chipko movement. For the purposes of the paper, we shall schematise them.

By counterpoising Chipko and the Technology Missions, the language of discourse becomes crucial.

CHIPKO	TECHNOLOGY MISSION
— Political movement	— A transfer of technology model
— Participative	— Managerial, participation is merely at extension level
— Concerned with raising the issue of survival against S&T developmental models	— Takes S&T and development as given
— Peoples knowledge system, women as key participants	— Bureaucrats and scientists as experts
— Language of folk, songs, stories; basically oral	— Language of expert, graphs, statistics
— Focus: the community and commons	— Focus: the nation-state and the electronic information system.

Throughout seminars and official presentations on the problems of water or immunisation, one witnesses the recurrent use of terms like 'problem village' and 'target population'. Such language really became overt in the American war against Vietnam. One is not a nominalist but one still fears that such concepts in the hands of development experts can become death warrants.

There is one last argument left to make. Of late, the Indian state has been enacting what might be called the circus model of the state. The government has indulged in huge spectacles which are the substitute of Roman circuses. We had first that great celebration of managerial and technological competence, the ASIAD. The state added to it the Festival of India, another great media spectacle. To add a bit more of nationalism we had Romi Chopra and OBM produce the Freedom Run. And to add to that ersatz nationalism a technological competence, we might have the technology run, the missions of Satyen Pitroda.

The question remains: how can we prevent the Technology Missions from degenerating into empty exercises or even examples of statist repression through future programmes on family planning, immunisation or housing? We offer three sets of suggestions drawn from the life experiences of concerned academics and activists.

The first is the idea of an ombudsman for each mission. In a wider sense, the idea of an ombudsman had been raised during the J.P. movement and, I believe, Ramakrishna Hegde did institutionalise it in Karnataka. The various missions, especially those on immunisation, water, housing and family planning, may generate a host of everyday complaints, which the bureaucracy may not be sensitive to. In this context the ombudsman *can* play his role with sensitivity and, at the same time, also respond to the specific problems of technological innovation in various forms.

This leads us to the second issue about the human rights implications of the various missions. The civil liberties groups have not been sensitive to the human rights problems posed by the various technocratic projects, despite the Bhopal gas disaster and the controversies surrounding the issue of nuclear energy. Voluntary groups must do the anticipatory work on the implications of displacement, obsolescence and iatrogeny. The PUCL — PUDR must attach an autonomous group to monitor and anticipate civil rights problems such missions might cause.

The record shows that technocratic experts like Jagmohan (urban planning), Ramanna (nuclear) and Kurien (dairy development) have not only developed authoritarian styles of functioning but are deeply antagonistic both to dissent and the right to information regarding their projects. Pitroda's Technology Missions, by being sensitive to such critical autonomous groups, might help produce the social innovations that technological and managerial systems in a democratic polity require. May be groups like the Medico Friends Circle (MFC), the Kerala Shastra Sahitya Parishad (KSSP) and the People's Science Institute could also monitor particular missions.

There is also a need for a wider notion of social audit than present in the cost-benefit, transfer of technology models of Pitroda. The notion of social audit has to work within a different set of philosophical concepts. The emphasis should be not only on national self-reliance but also on community reliance, and concepts such as productivity and efficiency should be complemented by ideas of sustainability. In addition, one requires a notion of time beyond the market, considering the rights of future generations as well. Such a notion of social audit must work out more creative notions of justice and suffering beyond the bureaucratic models of insurance and compensation.

These three responses are not substitutable and should not be collapsed into an empty committee with a panel of distinguished names. Such a group cannot respond to the everyday problems of the Technology Missions. Also, a nominal committee is inadequate to respond to the social innovations that the Technology Missions need. Pitroda's work should not be a narrowly conceived contribution to technology. To succeed, even technologically, the missions must contribute to widening the notions of both democracy and the commons in India. Otherwise Pitroda will go the way of Jagmohan, Kurien and Ramanna: proud of his expertise but contemptuous of the raucous demands of Indian democracy.

Further reading

BOOKS

Alvares, Claude. Homo faber. New Delhi: Allied Publishers, 1979.

Dinesh Mohan. Science and technology policy in India: Implications for quality of education, *in* Ratna Ghosh and Mathew Zachariah (eds): Education and the process of change. New Delhi: Sage Publications, 1987.

Dwivedi. O.P. (ed.). Perspectives on technology and development. New Delhi: Gitanjali Publishing, 1987.

Freire, Paulo. Reading the word and the world. London: Routledge and Kegan Paul, 1987.

George, Shanti. Operation flood. New Delhi: Oxford University Press, 1985.

India. Evaluation Committee on Operation Flood II: report. New Delhi: Ministry of Agriculture and Irrigation, 1984.

India. Department of Personnel and Administrative Reforms. Technology in rural development process. New Delhi, the Department, 1984.

Nandy, Ashis. The traditions of technology: on tradition, tyranny and utopia. New Delhi: Oxford University Press, 1987.

Stewart, Frances (ed.). Macro-policies for appropriate technology in Developing Countries. Colardo: Westview Press, 1987.

Technology policies and planning in India. Bangalore: Asian and Pacific Centre for Transfer of Technology, 1986.

Tisdel, Clem and **Priyatosh Maitra.** Technological change, development and the environment: socio-economic perspective. London: Routledge, 1988.

World Health Organisation. Technology for water supply and sanitation in developing countries. Geneva: W.H.O., 1987.

ARTICLES

Abid Hussain. Technology: key to renaissance. 'World Focus' 7 (11-12): November-December 1986: 17-20.

Alvares, Claude. The capital is gripped by Pitroda's modernizing fever: new missionaries in Delhi. 'The Indian Post': 16 August 1988.

Arulpragasam, L. C. 'Demand side' technology: an agricultural strategy based on small farm needs. 'Ceres' 18 (6): November-December 1986: 27-31.

Bajaj, J.K. Green revolution: a historical perspective. 'PPST Bulletin' 3 (2): 87-113.

Bajaj. J.K. and others. Impact of modernisation of milk and oilseeds sectors of Indian economy. 'PPST Bulletin' (11-12): 1987.

Banerji. D. Hidden menace in the universal child immunization programme. 'Ifda Dossier' (61): September-October 1987: 55-61.

Be Gandhian, Pitroda tells managers. 'The Telegraph': 17 April 1988.

Bharat Bhushan. Science and technology missions: planning process deficient. 'Times of India': 19 April 1986.

Bhatia, B.M. Bio-technology and Indian agriculture: development perspective in 2000 A.D. 'Indian Farmer Times' 4 (6): September 1986: 20-22.

Bhatty, I.Z. Technology for development. 'Akashwani' 58 (4): 16 February 1987: 6-8.

Chaudhuri, J.L. and **K. Selvaraj.** Technological developments in Ghani oil industry. 'Khadi Gramodyog' 32 (1-2): October-November 1985: 75-84.

Chopra, Anuradha. At C-DOT I'm no one: a life in the day of Sam Pitroda. 'Indian Express': 17 September 1988.

Denim, whisky and Gandhian ideals. 'The Sunday Observer': 31 July 1988.

D'Monte, Darryl. The press has allowed itself to be seduced by Sam Pitroda: injecting method into madness. 'The Indian Post': 27 August 1988.

Desai, N.M. Fostering technology transfer. 'Indian Management' 26 (5): June 1987: 27-28.

Dubashi, Jay. Limitations of hi-tech: combating poverty. 'Free Press Journal': 14 April 1986.

Gandhi, Rajiv. Harnessing science and technology for development. 'Yojana' 31 (9): 16 May 1987: 15-17.

Ganguly, A.S. A perspective on technology. 'Mainstream' 23 (50): 10 August 1985: 27-29.

Ghosh, Partha S. Strategies for harnessing technology. 'Business India' (229): 15 December 1986: 91-93.

Gill, S.S. Technology missions: big push to development. 'The Hindustan Times': 4 June 1988.

Giriappa, S. Technology in rural environment. 'Journal of Rural Development' 6 (4): July 1987: 406-17.

Gopalakrishnan, C.V. Updating telecom technology. 'The Hindu': 21 June 1985.

Gopalan, C. Consumption of edible oils in India — the present picture. 'NFI Bulletin' 9 (2): April 1988.

Gowarikar, Vasant. Indian science and technology in transition. 'Democratic World' 17 (38): 18 September 1988: 13-15.

Gupta, Ranjit. Why India must embrace technology. 'The Telegraph': 9 December 1986.

Hanumantha Rao, C.H. Science and technology policy: an overall view and broader implications. 'Indian Journal of Agricultural Economics' 41 (6): July-September 1986: 229-34.

Housing may be next technology mission. 'The Times of India': 1 September 1988.

Jha, Ajay N. The information revolution is here to stay whether we like it or not. 'The Hindustan Times': 6 September 1988.

Kathuria, Sanjay Technological change in developing countries: a note. 'Economic and Political Weekly' 22 (40): 3 October, 1987: 1710-12.

Krishnan, N.L. Real issues in choice and absorption of technology. 'The Hindu': 17 December 1987.

Kulandaiswamy, V.C. Science and technology in India: areas of strength and weakness. 'Bhawan Journal' 32 (22): 15 June 1986: 23-34.

Kumat, R.S. Dairy development on Amul pattern. 'Link' 28 (35): 6 April 1986: 14-15

Lavakare, P.J. Taking technology to the poor. 'Yojana' 29 (1-2): 26 January 1985: 4-6, 26.

Limaye, Madhu. On appropriate technology. 'Janata' 42 (4): 5 April 1987: 5-8, 16.

Lip service to integration decried. 'The Telegraph': 8 May 1988.

Lobbying by multinationals: C-DOT complains of thwarted efforts. 'Indian Express': 13 December 1986.

Madhok, Sujata. The illiteracy issue. 'The Hindustan Times': 4 September 1988.

Majumdar, R. Need for caution in new technology (analysis the important objectives of the proposed new education policy in India). 'Statesman': 17 March 1986.

Menon, Usha. Technology and development aid: the case of Ganga Action Plan. 'Economic and Political Weekly' 23 (33): 13 August 1988: 1693-1701.

Minocha, Naresh. Pitroda fails to spike mobile phone project. 'The Indian Post': 19 March 1988.

———. Where Pitroda played different tunes. 'The Indian Post': 20 March 1988.

Narasimha Rao, P.V. Main parameters of technonology. 'Mainstream' 25 (19): 26 January 1987: 11-14.

Narayanan, K.R. New technology mission for better health. 'Mainstream' 25 (28): 28 March 1987: 15-17, 22.

National technological missions identified. 'Yojana' 30 (22): 1 December 1986: 29-30.

Neri, Michael. Is Pitroda quitting. 'The Indian Post': 27 July 1988.

Otway, Harry and **D.L. Sims.** Criteria for technological choice. 'Public Administration' 65 (2): Summer 1987: 131-43.

Parathasarthy, G. Social impact of hi-tech and public policy. 'Link' 29 (2): 15 August 1986: 6-8.

Patel, Surendra J. Towards a new technological order. 'Mainstream' 22 (27): 3 March 1984: 6-8.

Patwardhan, M.S. Changing technology: effects on economic progress. 'Economic Times': 30 April 1986.

Pitroda. S.G. Country needs brainware. 'The Times of India': 8 May 1988.

———. Dream of tomorrow. 'The Statesman': 15 August 1988.

———. Managing technology transfer. 'Indian Management' 26 (5): June 1987: 25-26.

———. Seventies were early, nineties will be late. 'The Sunday Observer' 7 May 1988.

Pitroda water grant piques MLAs. 'The Hindustan Times': 2 June 1988.

Prabhakar, A. New information technologies. 'Rajasthan Patrika': 6 September 1986.

Pramod Singh. Impact of science and technology on Indian rural environment. 'Kurukshetra' 34 (8): May 1986: 14-17.

Rai, Usha. Immunisation: the challenges ahead. 'Times of India': 8 September 1987.

Rajagopalan, V. and **C. Ramasamy.** Impact of technological change in agriculture on rural welfare. 'Agricultural Situation in India' 41 (9): December 1986: 723-29.

Rajan, P.S. Taking technology to the backward areas: role of N.R.D C. 'Indian Worker' 35 (1): 6 October 1986: 37-39.

Rakesh Basant. Agriculture technology and employment in India. 'Economic and Political Weekly' 22 (31): 1 August 1987: 1297-1308.

Rele, Subhash J. Need India miss the bio-technology bus? 'Yojana' 30 (7): 16 April 1986: 29-30, 34.

Roy, Ranjit. I am a catalyst in the true sense of the word: interview with Sam Pitroda. 'The Telegraph': January 1988.

Santhanam, M. R. Education technology -- concept, role and significance. 'Education Quarterly' 39 (1): Spring 1987: 1-6.

Sehgal, Rashme. The daring task of literacy. 'The Statesman': 10 September 1988.

Sen, Anikendra Nath. Satyen Pitroda: Sam and his pipe dreams. 'Onlooker': 30 April 1988.

Sen, Jai, On housing. 'Lokayan Bulletin' 3 (3-5): 1985.

Sethi, Harsh. The great technology run. 'Economic and Political Weekly' 23 (20): 14 May 1988: 999-1002.

Shahi, Pushkar Narain. Technological world, hope or despair. 'Indian Nation': 27 April 1986.

Shukla, Mukul Kumar. Indian expertise on trial. 'The Hindustan Times': 30 March 1988.

Singh, Tavleen. Satyen Pitroda: a man with several missions. 'Debonaire': September 1988.

———. Super Doon and super Sam. 'The Indian Express': 24 April 1988.

Srinivasan, M.R. Technology: the crucial strategic variable in national development. 'Indian Management' 26 (5): June 1987: 3-7.

Subbarao, Duvvuri. Technology tie ups. 'Economic Times': 2, 3 June 1987.

Swaminathan, S. Volunteers are the key to the literacy mission. 'The Times of India': 16 August 1988.

Technology mission for drinking water: half an hour discussion. 'Lok Sabha Debate': 25 March 1987.

Technology mission on dairying. 'The Hindustan Times': 15 August 1988.

Technology missions. 'The Times of India': 2 August 1988.

The only way is to do it, says Pitroda. 'The Times of India': 8 September 1988.

Thukral, Gobind. Pitroda's crusade for national missions. 'The Hindustan Times': 11 February 1988.

Varadarajan, S. New directions in technology. 'Business Standard': 7 October 1986.

Vashist, P.D. Role of science and technology in shelter for all. 'Kurukshetra' 36 (9): June 1988: 12-14.

Vepa, Ram K. Technology and rural uplift. 'Indian Express': 8 August 1986.

Yao-Chi-Lu. Impact of technology and structural change on agricultural economy, rural communities and environment. 'American Journal of Agricultural Economics' 67 (5): December 1985: 1158-63.

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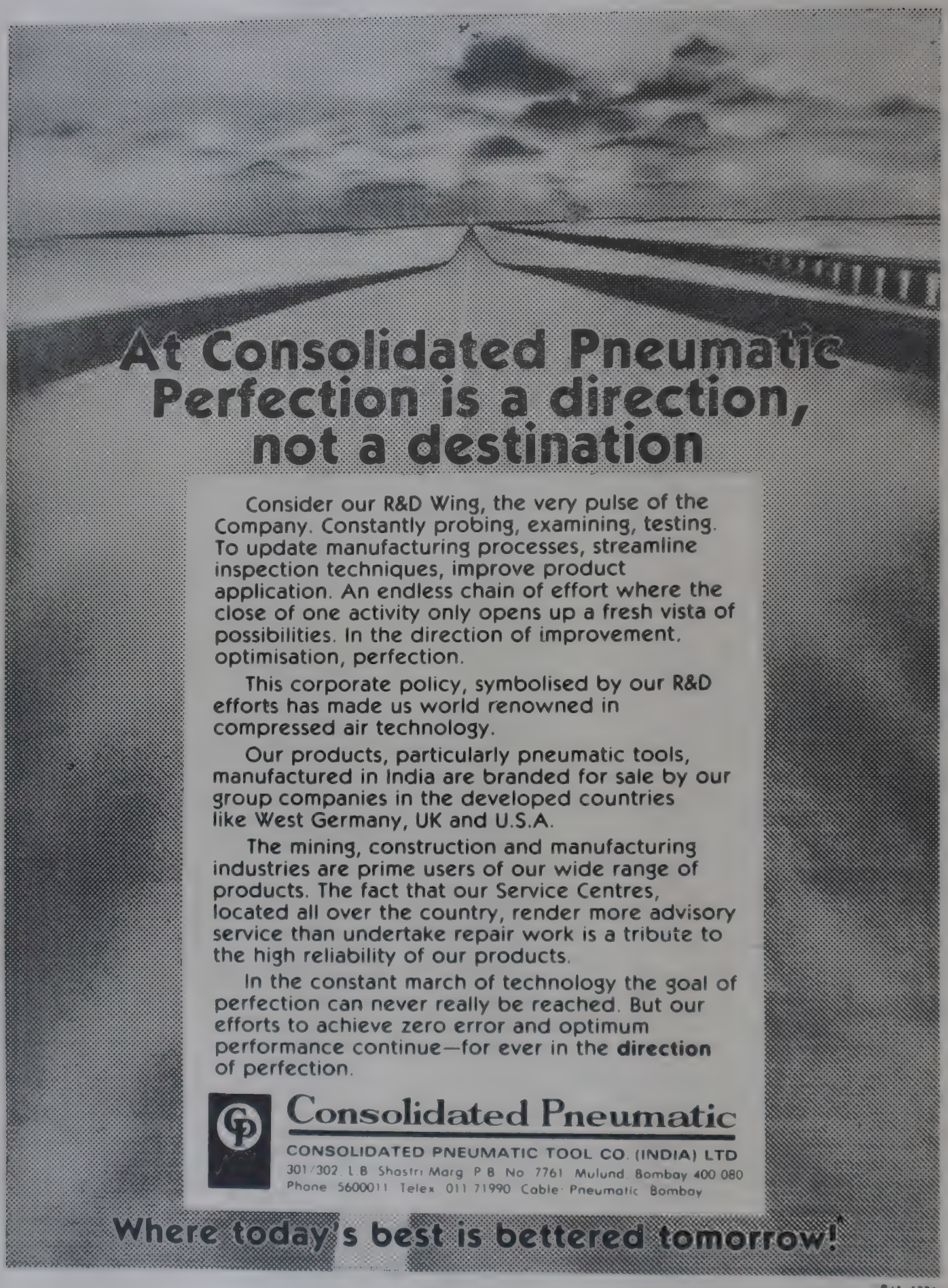

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The mining, construction and manufacturing industries are prime users of our wide range of products. The fact that our Service Centres, located all over the country, render more advisory service than undertake repair work is a tribute to the high reliability of our products.

In the constant march of technology the goal of perfection can never really be reached. But our efforts to achieve zero error and optimum performance continue—for ever in the **direction** of perfection.

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Under this Scheme, you as an adult, can make a gift to your parent or any other adult.

How does the Scheme work?

Your gift grows at a rate of 12.5% per annum, compounded every 6 months. That means an investment of Rs. 1000 will grow to Rs. 1624 or Rs. 1833 in 4 or 5 years respectively (depending on your choice).

After this period, the accumulated amount, automatically reinvested under the Monthly Income Scheme will offer an assured monthly income at 12% per annum for the next 5 years. After which, the sum goes back to the investor/donee with capital appreciation.

How much can one invest?

You can invest in a minimum of 10 Units (Rs. 1000). There is no maximum limit. What's more, you can keep adding to your gift as many times as you like. The Scheme is open throughout the year.

What are the other benefits?

You can avail of the usual tax benefits applicable to Units. (The present gift tax exemption limit is Rs.20,000). What's more, you can pledge your Units with banks if ever you should need a loan. Under PGGF, you can also avail of nomination facilities.

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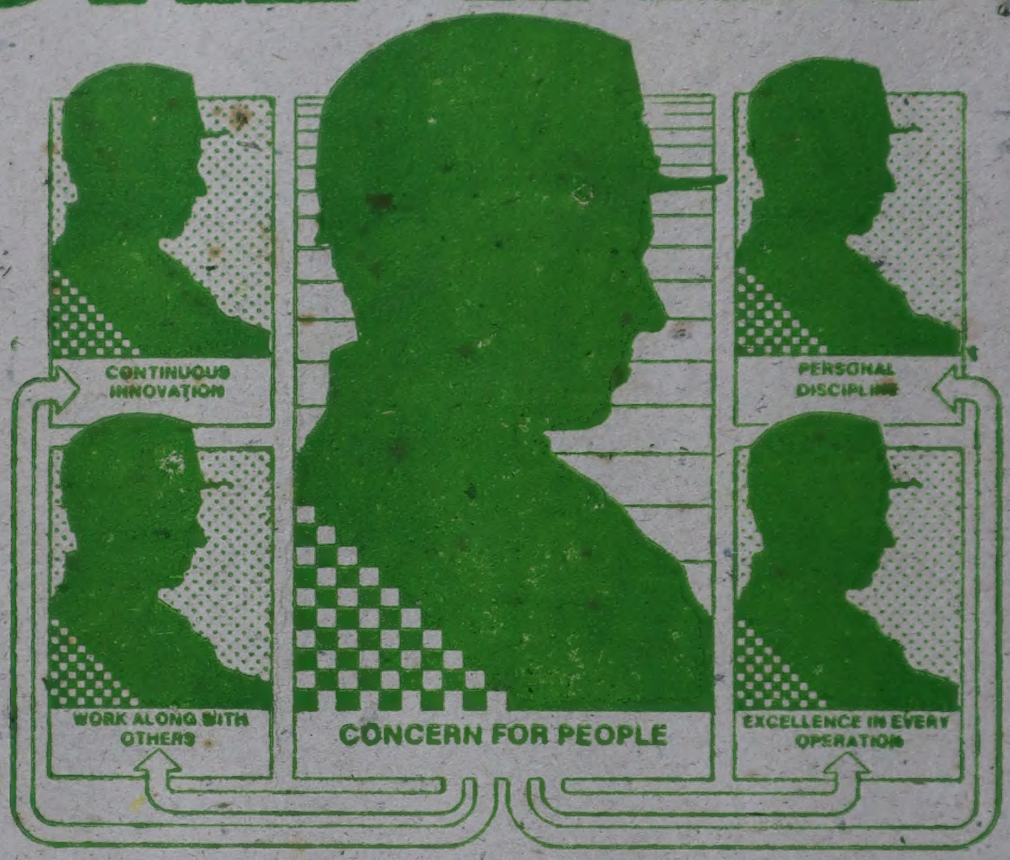

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Printed and Published by Malvika Singh on behalf of the Romeshraj Trust from Malhotra Building, Janpath, New Delhi, and Printed by her at Shaheed Prakashan Press, A-794, Amar Puri, Nabi Kareem, Pahar Ganj, New Delhi-110055 Phone: 778440